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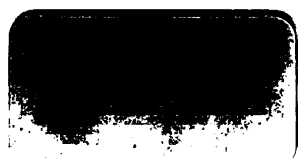
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Cordial Regards
of C-Ea Whisen

HEALTH SURVEY OF NEW HAVEN

A REPORT PRESENTED TO THE CIVIC FEDERATION OF
NEW HAVEN BY CHARLES-EDWARD AMORY WINSLOW,
JAMES COWAN GREENWAY AND DAVID GREENBERG
OF YALE UNIVERSITY



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THE HEALTH SURVEY OF NEW HAVEN

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HEALTH SURVEY OF NEW HAVEN, CONNECTICUT

LETTER OF TRANSMITTAL

Dr. Charles J. Bartlett,
President, Civic Federation of New Haven.

Dear Sir:

In the autumn of 1915 Dr. H. B. Ferris, on behalf of the Section on Sanitation of the Civic Federation, invited me to undertake a survey of conditions affecting the health of the city of New Haven and to present a comprehensive plan for the development of the health protective machinery of the community along the most modern and effective lines. I was glad to undertake this congenial task; and through the far-sighted and generous policy which specifically provided that the resources of the Anna M. R. Lauder Department of Public Health in the Yale Medical School should be used to further the general cause of public health in the State of Connecticut, it has been possible for me to devote considerable time to this problem during the past year and a half. I have been fortunate in being able to associate with myself in the work Dr. James C. Greenway, Director of the Department of University Health and Lecturer in the Department of Public Health, and Mr. David Greenberg, Instructor in the Department of Public Health. We have now completed our task; and have the honor of transmitting to you herewith our findings and our recommendations.

We desire to record our appreciation of the assistance rendered during the course of this study by Mr. D. O'Brien of the Yale Medical School, Mr. L. S. Kelley of Yale College, and Mrs. B. H. Bartlett of Teachers College who have coöperated in the work; by officials of the New Haven Water Company, the City Engineer's office, the City Forester's office, the Infant Welfare Association, the Visiting Nurse Association, and the New Haven Dispensary; by the physicians who gave us data in regard to malaria cases; and particularly we acknowledge the constant courtesy and helpfulness of Dr. Wright and his entire staff, who have assisted us in every way, have placed all the records of the department at our disposal, and have contributed freely of their time to supply us with the information needed in the conduct of our work.

Surveys must frequently be largely critical and destructive in their nature. Such has fortunately not been the case with the problems pre-

sented for our consideration. New Haven has a good water supply (which slight additional precautions can make ideally perfect from a sanitary standpoint), it has an excellent system of sewers which has been diligently extended and utilized. The fly and mosquito problems are being attacked with vigor and intelligence, in large part as a result of the activity of your Federation.

The city has a public-spirited and forward-looking Board of Health and a Health Officer of long experience and complete devotion to the duties of his office. Under his tactful and judicious leadership the staff of the department has seemed to us to be animated by a spirit of loyalty and coöperation deserving of high praise. The supervision of nuisances, and the inspection of tenements, food stores, restaurants, and dairy farms is faithfully and well done. The division of communicable diseases, although pursuing certain policies which seem to us injudicious, has in the main proved unusually successful in its work. New Haven has been a pioneer in the development of medical inspection of schools and has been prompt to realize the value of the recent movement for dental hygiene. The Board of Education is doing well its part in protecting the health of the school child by attention to the provision of sanitary conditions in the schoolhouse.

The problem of infant mortality has been attacked with vigor and success by the Visiting Nurse Association and the Infant Welfare Association; the problem of tuberculosis with equally marked success by the Visiting Nurse Association and the New Haven Dispensary. New Haven is fortunate in possessing a Visiting Nurse Association which enjoys and deserves a national reputation, and an unusual group of skillful and public-spirited physicians gathered about the New Haven Hospital and the Dispensary as a nucleus. Nor should the splendid sanatoria maintained by the State of Connecticut and by the New Haven County Tuberculosis Association be forgotten in counting up the health assets of the community.

On the debit side of the account we have pointed out below a number of sanitary defects which still exist and which we believe should receive the attention of your Federation.

We have urged improvements in the state housing law and a better provision for safeguarding the worker against occupational diseases. Locally there are four major sanitary problems which seem to us to demand attention, aside from the expansion of the work of the Health Department itself. These are the treatment of the sewage which now constitutes an offensive and a dangerous pollution in many parts of the Upper Harbor, the establishment of a municipal abattoir, the elimination of mosquito-breeding marshlands, and the provision of an adequate system for the

collection of garbage and refuse. It is unnecessary to labor the need for sewage treatment since the city has already appropriated money for an experiment station to determine the best method of attaining this end; your Federation should, however, be prepared to give its earnest support to the prompt execution of whatever plan of relief may finally be decided on as most feasible. The importance of anti-mosquito work has also been recognized by a city appropriation. We think it important in connection with this problem that the danger to health from the fresh water mosquitoes which breed in the neighborhood of Beaver Swamp and West River, and now cause many cases of malaria, should not be forgotten in the desire to remove the more obvious but less dangerous nuisance of the salt marsh mosquito. An improvement in the system of collecting garbage and the inauguration of a public and general system of collecting ashes and rubbish seem to us to be urgently called for in the interest of public decency if not of public health. The mountains of refuse which collect during the winter months in the poorer districts are not creditable to the city. Their existence is inevitable unless systematic removal of all wastes is provided for at public expense.

The milk supply of the city is a problem which seems to us in need of serious attention. Farms are inspected but the milk as sold in the city is not subject to any effective bacteriological control, and its general condition as indicated by our own studies is very far from satisfactory. If the people of New Haven are to be protected from the danger of milk-borne disease it is essential that the supply should be supervised by recognized bacteriological methods, that all milk should be graded and labeled according to the plan now in use in many cities, and that every effort should be made to secure as rapidly as possible the pasteurization by the holding system of all milk not of certified grade,—for it is only by means of such pasteurization that a generally safe supply can be secured.

Our most important problems have been those which concern the Health Department of the city, its organization and development. It is to-day a good department; but it should be a far better one. The classical powers and duties of a health department are now exercised with diligence; but the newer possibilities of modern public health are unattained. Dr. Wright has not been blind to these opportunities. He specifically called attention to many of the most essential needs of the department in a letter to me under date of April 18, 1916. These ends have not been realized because funds were lacking and funds were lacking simply because the governing powers of the city have not fully realized the beneficent potencies of a health department thoroughly organized along modern lines.

The present Department of Health has an excellent general and a good corps of privates; but with the exception of Dr. Lewis, the bacteriologist

and epidemiologist, it is entirely lacking in trained and competent lieutenants. The one essential need which has been made clear by our studies is the need for providing the department with half a dozen efficient and well-qualified divisional directors, who could supervise the work of their subordinates and aid the health officer in the organization and development of their particular lines of work.

The following expansions of the work of the Department of Health appear to us to be essential to its greatest usefulness:

a. A practical rearrangement of powers and duties by which the Board of Health shall be able to devote its energies to the framing of a sanitary code and the outlining of broad departmental policies, leaving the conduct of administrative details in the hands of the health officer.

b. An organization of the Department of Health in divisions, the present inspection and nursing staffs being each placed under a supervisory head.

c. A strengthening of the division of communicable diseases by the addition of a nurse and a clerical assistant.

d. The reorganization of the laboratory as a separate division of the department.

e. The transfer of the work now done by the Registrar of Vital Statistics to the Department of Health.

f. The reorganization of the work of medical inspection of school children so as to provide for a comprehensive system of school clinics.

g. The appointment of an expert on tuberculosis to coördinate and develop the general campaign against this disease.

h. The support by city funds of the Day Camp now maintained by the New Haven Hospital.

i. The employment (for the present through the Infant Welfare Association and the Visiting Nurse Association) of three additional nurses for infant welfare work and three for anti-tuberculosis work.

The cost of the suggested additions to the work of the department would be approximately \$34,000 a year, which when added to the present appropriation of \$40,000 would increase the per capita expenditure for health work from 26 to 48 cents, the latter figure corresponding closely to the figure of 45 cents which has been set forth as a general average standard by the American Public Health Association.

The vital statistics of the city show that the Health Department as at present constituted, and the splendid private organizations at work in the health field, have accomplished much. Tuberculosis, infant mortality, acute communicable diseases and last year even typhoid fever, show gratifying reductions and rates well below the average for American cities. Much, however, yet remains to be done. Marked discrepancies

between the death rates in the poorer and the more prosperous wards show how greatly elementary sanitation is needed in the tenements. Even pneumonia, cancer and the degenerative maladies, which are all particularly prevalent diseases in New Haven, can hopefully be attacked by an instructive health campaign.

"Public Health Is Purchasable. Within Natural Limitations a Community Can Determine Its Own Death Rate." The truth of this saying has been demonstrated time and again. It has been demonstrated in New Haven by what has already been accomplished. There yet remain, however, much preventable disease and death from which the sufferers may be ransomed if public sentiment demands it. A hundred lives a year could be saved in this city by a thoroughly organized public health campaign such as the organization we have suggested would make possible. If your Federation can convince the city authorities of the facts the funds will be forthcoming, and New Haven will be given a health department thoroughly adequate for modern needs and full of beneficent possibilities for the health and welfare of her citizens.

Respectfully yours,

C.-E. A. WINSLOW.

April 1, 1917.

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RECOMMENDATIONS

Recommendation I. That the Committee on Tenement House Conditions of the Civic Federation investigate the present Housing Laws of Connecticut and consider the advisability of strengthening them along the lines of the Model Housing Law, or of supplementing them by more exacting municipal ordinances, particularly so as to guard against lot overcrowding, dark halls and dark toilets, in new buildings, and to provide for adequate fire escapes in both new and old buildings.

Recommendation II. That the Committee on Tenement House Conditions of the Civic Federation inaugurate a systematic campaign for the widest possible extension of the activities of The Improved Housing Association to the end of providing through private endowment for more model homes ; and that the Committee give consideration to the possibility of securing from the city government appropriations for municipal tenements such as have been so successfully operated by European municipalities.

Recommendation III. That the Civic Federation organize a new Committee on Industrial Hygiene to study the question of securing adequate protection for industrial workers against occupational poisonings, and the dangers of bad ventilation, industrial dusts and other insanitary factory conditions, and present to the Legislature of 1918 a plan for securing these ends ; and we suggest that this committee should also direct its attention to the importance of having appointments in the present Department of Labor made on a merit basis after civil service examination.

Recommendation IV. That the movement for a system of Health Insurance in Connecticut should receive the earnest consideration of the Civic Federation as an important step toward the prevention of occupational and other diseases.

Recommendation V. That steps be taken to secure at all times the complete safety of the New Haven water by providing for the treatment by chlorination of the Saltonstall, Wintergreen and Maltby supplies.

Recommendation VI. That an ordinance be passed requiring all privies to be tightly constructed, screened against flies, and maintained in a sanitary condition ; and that a special inspector be detailed to supervise the enforcement of these regulations.

Recommendation VII. That pending the treatment of the city sewage the taking of shellfish from the harbor of New Haven be prohibited except under such precautions as will ensure adequate purification before they are used as food.

9 Recommendation VIII. That pending the treatment of the city sewage bathing be prohibited in the more grossly polluted portions of the harbor, the limits of the prohibited area to be defined by the Board of Health.

Recommendation IX. That so soon as the experiments on sewage disposal are completed the sewage of the city should be treated as promptly as possible by such means as seem best adapted to eliminate local nuisances and render the harbor waters safe for bathing and for the taking of shellfish.

Recommendation X. That the present system of garbage collection should be improved so as actually to secure in all sections of the city the regular and frequent removals now called for by agreements with contractors; and that a regular public system of collection be instituted for other classes of refuse.

Recommendation XI. That in the drainage operations planned for 1917 the fresh water areas which are likely to breed malarial mosquitoes (such as those in Beaver Swamp, on the shores of West River and of Lake Whitney, and in East Haven) should receive first attention.

Recommendation XII. That the Board of Health modify its regulation in regard to mosquito breeding receptacles so as to declare any accumulation of stagnant water in which mosquitoes breed to be a public nuisance.

Recommendation XIII. That the Board of Health adopt a regulation declaring malaria to be a notifiable disease and that provision be made for investigating each case as reported in order to determine the existence of local foci of infection.

Recommendation XIV. That Section 95 of the Charter Act be amended so as to provide that the Board of Health shall appoint the Health Officer and determine the general policies of the department, while the conduct of administrative details shall be entrusted to the Health Officer, and all appointments of other employees shall be made by him under the rules of the Civil Service Board.

Recommendation XV. That the Board of Health prepare and adopt a comprehensive and up-to-date Sanitary Code; and that the Health Committee of the Civic Federation urge upon the Board of Aldermen the propriety of permitting to the Board the free exercise of this power within the legitimate field of public health, unhampered by aldermanic ordinances.

Recommendation XVI. That the need for adequate quarters for the Department of Health be vigorously urged upon the proper city authorities.

Recommendation XVII. That the Board of Aldermen take such action as may be necessary to place responsibility for the inspection and

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control of ordinary nuisances, such as are due to accumulation of rubbish in vacant lots, yards and the like and the investigation of complaints relating thereto, in the hands of the police department, so that the inspectors of the health department may devote their attention to the problems of fly and mosquito control, the protection of privy vaults, the improvement of housing conditions, and other matters bearing more directly upon health.

Recommendation XVIII. That the Farm Inspector, the Milk Inspector, the two Food Inspectors, the four Sanitary Inspectors (excluding the one assigned to communicable disease work) and the Tenement House Inspector be organized as a Bureau of Inspection, with a Chief or Supervising Inspector at a salary of \$2000, to be chosen by competitive examination from the ranks of the present staff.

Recommendation XIX. That the Civic Federation through some appropriate committee consider the question of the adequacy of the staff of the City Attorney's office to the present needs of the city, and the advisability of taking steps to secure the appointment of an additional assistant in that office.

Recommendation XX. That provision should be made in the Sanitary Code for requiring the medical examination of food handlers along the general lines of the New York City Ordinance upon this subject.

Recommendation XXI. That steps should be taken to provide a municipal slaughterhouse within the city limits and that regulations be included in the Sanitary Code prohibiting the sale of meat which has not been passed at the time of slaughter by either Federal inspectors or those of the local department of health. 2

Recommendation XXII. That provision be made for the systematic bacteriological examination of all milk sold in New Haven, for the determination of the numbers of bacteria contained therein.

Recommendation XXIII. That a regulation be passed defining pasteurization as heating to at least 140° for at least 30 minutes, and that provision be made for systematic and frequent inspection of pasteurizing plants to see that these conditions are attained.

Recommendation XXIV. That all milk sold in New Haven be graded and labeled according to the general plan that has been followed by the New York State Department of Health and other official bodies.

Recommendation XXV. That every possible effort be made to secure as rapidly as may be feasible the pasteurization by the method defined above of all milk not of certified grade, under the supervision and control of the Board of Health.

Recommendation XXVI. That special efforts be made to call to the attention of the medical profession the importance of prompt reporting of

all cases of communicable disease and to secure the vigorous enforcement of the law which requires such notification.

Recommendation XXVII. That the opportunities for hospital isolation offered by the Isolation Building of the New Haven Hospital be more fully utilized, and that cases of typhoid fever be hospitalized whenever they cannot be properly cared for at home.

Recommendation XXVIII. That the promising policies of the Department of Health in the treatment of carriers be continued, but that they be supplemented by such measures of control of frank cases and contacts as are generally considered wise and necessary by recognized sanitary authorities.

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Recommendation XXIX. That information disseminated to the general public through the medium of the annual report, monthly bulletin and other publications of the Department of Health be confined to those scientific facts which are generally accepted by competent leaders in the fields of medicine and public health, novel and controversial opinions being presented to the proper audience through the medium of the scientific press.

Recommendation XXX. That Dr. Lewis be relieved of responsibility for the laboratory of the Health Department and permitted to devote himself to the problems of communicable disease control; and that he be provided with a public health nurse at \$1000 and a clerk at \$600 for the adequate prosecution of this work.

Recommendation XXXI. That the Department of Health undertake a vigorous educational campaign among physicians and the general public in the interest of a more general and more prompt use of diphtheria anti-toxin and a wider protection of the public against typhoid and smallpox by the use of vaccines.

Recommendation XXXII. That the laboratory work of the Department of Health be separated from the medical work of communicable disease control and placed under the direction of a bacteriologist at \$2000 with an assistant chemist at \$1200 and the present technician to assist him; that the work of the laboratory be reorganized along the generally accepted lines of standard procedure and expanded as rapidly as possible to include quantitative bacteriological examination of milk, Wassermann tests, examination for typhoid carriers, and identification of pneumococcal types for assistance in the administration of sera.

Recommendation XXXIII. That the office of Registrar of Vital Statistics be abolished and that a statistician at \$2000 and a clerk at \$1000 be added to the staff of the Department of Health.

Recommendation XXXIV. That the vital statistics published in the annual report of the Department of Health be extended and modified so

as to present the fundamental data generally recognized as essential by vital statisticians.

Recommendation XXXV. That a definite plan for coöperation in the summer campaign against infant mortality be worked out by conference between the Department of Health and the Infant Welfare Association.

Recommendation XXXVI. That the city appropriate the sum of \$3000 annually to be expended by the Infant Welfare Association and the Visiting Nurse Association for the establishment of an additional station and for further Infant Welfare work, particularly along the lines of prenatal care and the organization of Little Mothers' Leagues.

Recommendation XXXVII. That an obstetrical nurse at a salary of \$1200 be added to the staff of the Department of Health to supervise the work of registered midwives.

Recommendation XXXVIII. That the work of medical school inspection be reorganized and expanded along the lines laid down in this report, to include the organization of medical clinics, with the provision of the following new appointees in addition to the present staff: a Medical Supervisor at \$2500; a Supervising Nurse at \$2000; two clinic nurses at \$850 each; a clerk at \$750; an additional dentist at \$1000; and an additional dentist's assistant at \$400.

Recommendation XXXIX. That the Department of Health adopt vigorous measures for the control of the willfully careless consumptive, by forcible control when necessary, along the lines adopted in dealing with other forms of communicable disease.

Recommendation XL. That the city appropriate \$3000 a year for extending the work of the Visiting Nurse Association in the care and prevention of tuberculosis and \$2000 a year for the maintenance of the Day Camp; and that pending such an arrangement every effort be made to maintain the Day Camp through the generosity of private individuals.

Recommendation XLI. That there be added to the staff of the Department of Health a competent physician trained in anti-tuberculosis work (at a salary of \$2500) to supervise and coördinate and develop the campaign against this disease along the most effective lines.

Recommendation XLII. That the Board of Health undertake an organized educational campaign among physicians in regard to the prompt diagnosis and notification of venereal diseases, and prepare a circular in regard to the prevention and cure of these diseases for distribution to those whom it might benefit.

Recommendation XLIII. That the Civic Federation organize a committee on Social Hygiene to study the general problems of venereal disease in New Haven, to raise funds for the provision of salvarsan treatment and for the extension of clinical facilities, particularly on the social

service side, and to take part in the state-wide educational movement now in progress in regard to the broader problems of social hygiene.

Recommendation XLIV. That the public health education work of the Department of Health be extended and amplified, especially with reference to the control of the constitutional diseases of adult life, and particularly by the fullest possible use of the resources of the daily press.

Recommendation XLV. That the budget of the New Haven Health Department be increased from \$40,000 to \$74,000, so as to make possible the various extensions of its activities specified in earlier recommendations.

HEALTH SURVEY OF NEW HAVEN, CONNECTICUT

A Report Presented to the Civic Federation of New Haven

by

**C.-E. A. Winslow, James C. Greenway and David Greenberg
Yale School of Medicine**

A. INTRODUCTORY

The City and Its Population

New Haven was incorporated as a city in 1784 with a population of a little over 3000. It was for a time one of the foremost shipping ports of the country until the Embargo Act of 1807 and the War of 1812 checked development along this line. The Joint Stock Corporation Act of 1837, however, furnished a stimulus to industrial enterprise and the growth of New Haven as an industrial center was well under way, fifty years or more ago, Eli Whitney's gun factory, the clock company and the rubber shop being the leading establishments.

The railroad to New York, completed in 1849, was an important factor in the development of the city; and the location in New Haven of the general offices of the New York, New Haven & Hartford Railroad Company has made the railroad a doubly significant factor in the life of the community. Industrial production has largely followed the historical lines of firearms, clocks, carriages, rubber goods, hardware and corsets, most of which were initiated fifty years ago, the munition trades in particular having undergone a phenomenal development during the past two years. Brickmaking and oyster culture are also important industries of New Haven and its surrounding suburbs.

The presence of Yale University has for two centuries been a significant factor in the social and economic life of the community.

The population of New Haven rose from 5157 in 1800 to 22,529 in 1850, 50,840 in 1870, 85,981 in 1890, 108,027 in 1900 and 133,605 in 1910. Using the census method of calculation, which assumes a direct arithmetical progression, the estimated population for July 1, 1916, would be 149,685. It seems certain that the great development of the munitions industry in the past two years has led to a greater addition of population than the annual increment of 2590 estimated by the Census Bureau. Dr. F. W. Wright, the Health Officer of New Haven, on the basis of information furnished by some of the larger employers of labor, estimated that 5000 operatives came to the city in 1915 of whom one-fourth brought their families with them. We are informed that 4200 new hands were taken on in one factory in 1915 and 3500 in 1916. The city directory offers corroborative evidence of abnormal growth during the past two years. The average annual increment of names in this publication between 1910 and 1914 was 1660, while the list increased by 2869 names in 1915 and by 3078 names in 1916.

On the other hand it is known that many of the operatives attracted by recent industrial developments reside in surrounding suburbs; and of those who do live in New Haven a majority are unaccompanied by their families. The school records do not indicate any abnormal addition to the child population. The average annual increase in the average number of children registered between 1910-11 and 1914-15 was 690, while the increase for 1915-16 was 813. The population of 149,685 derived by the census method of calculation is almost certainly too low, but since the excess population is largely made up of persons at an age when the death rate is not large and the practice of estimating population on any other than the regular arithmetical basis is in general so liable to abuse, we have deemed it best to use the conservative figure in all subsequent calculations. It is very probable, however, that the death rates so calculated may be from half a point to a point per thousand too high.

The age and race composition of the population of New Haven as compared with the urban population of the Registration Area of the United States is shown in the tables below. The data are for 1910 and are derived from the reports of the United States Census. The influx of population since 1914 has been predominantly of young adults, at first, as we are informed, largely of native and English stock, with more recent increments of Poles and of native and Portuguese negroes.

The age distribution of the population of New Haven in 1910 (see Table I) was of a nature distinctly unfavorable to a low death rate, an unusually large proportion of its population being in the age groups of high mortality—under 5 and over 45 years.

New Haven has a high proportion of population of foreign or mixed

parentage and a very high proportion (32 per cent, against 23 per cent for the cities of the Registration Area) of foreign nativity. The principal foreign stocks represented (indicated in Table II below) are Italian (31 per cent), Irish (21 per cent), and Russian (19 per cent). The first and last of these as shown in a recent study by L. I. Dublin* are characterized by death rates practically as low as those of the native born. The Irish race in America, on the other hand, generally shows a markedly excessive death rate, and the presence of this racial group in such large numbers is a distinctly unfavorable factor from the standpoint of probable mortality.

TABLE I

PERCENTAGE COMPOSITION OF THE POPULATION OF NEW HAVEN IN 1910 COMPARED
WITH THE TOTAL URBAN POPULATION OF THE REGISTRATION AREA

NEW HAVEN

Ages	All Classes	Native white		Foreign- born white	Negro
		Native parentage	Foreign or mixed parentage		
All	100.0	28.2	37.0	31.9	2.6
Under 5	10.3	2.8	7.0	0.2	0.2
5-14	18.1	5.4	10.4	1.9	0.4
15-24	18.9	5.1	7.5	5.9	0.5
25-44	32.4	8.0	8.7	14.6	1.1
45-64	15.8	4.9	3.1	7.3	0.4
65+	4.3	2.0	0.3	1.9	0.1

UNITED STATES—URBAN

Ages	All Classes	Native white		Foreign- born white	Negro
		Native parentage	Foreign or mixed parentage		
All	100.0	41.6	28.9	22.6	6.3
Under 5	9.8	4.7	4.3	0.2	0.5
5-14	17.3	8.2	6.9	0.1	1.1
15-24	20.0	8.6	6.3	3.9	1.4
25-44	33.2	12.5	8.0	10.2	2.3
45-64	15.2	5.8	3.1	5.4	0.8
65+	4.0	1.8	0.3	1.7	0.2

**American Economic Review*, VI, 3, September, 1916.

TABLE II
ORIGINAL NATIONALITY OF FOREIGN-BORN POPULATION

	New Haven	Registration Area
Austria	2.6	8.7
Canada, French	1.1	2.8
Canada, other	2.0	6.0
England, Scotland and Wales	6.2	9.0
France	0.4	0.9
Germany	9.6	18.5
Greece	0.2	0.7
Hungary	1.1	3.7
Ireland	21.0	10.0
Italy	30.7	9.9
Netherlands and Belgium	0.4	1.2
Norway, Sweden, Denmark	4.5	9.3
Russia, including Finland	18.7	12.8
Turkey	0.4	0.7
All others	1.3	5.6

Topography and Climate

New Haven occupies an area of 11,460 acres, to the north and along the east shore of New Haven harbor (see Fig. 1). It includes fifteen wards, the first twelve of them, constituting a rather compact roughly circular area west of the Quinnipiac River, representing the city as it was prior to 1897. Ward 13 (Westville) lies to the northwest of the rest of the city, while Wards 14 and 15 (Fair Haven) border the east shore of the Quinnipiac and the harbor. The last three wards, as will be noted later, retain a measure of independent local self-government.

The city is situated on a generally level plan with ranges of hills on the east and west close to the city, and on the north at a slightly greater distance. The soil is sandy, the underlying rock deposits lying from two to one hundred feet below the surface.

The following data as to climatic conditions, have been courteously furnished by Mr. L. M. Tarr, Local Forecaster of the United States Weather Bureau. The mean temperature for the year is 50° F. The mean temperature for January is 27° and for July 72°, giving a seasonal range of 45° between the coldest and hottest months. The daily range of temperature is 16°. Extreme and sudden changes are rare. There have never been more than three days in succession with temperatures below zero or more than four days in succession with temperatures above 90°. The mean temperatures for New Haven lie as would be expected between those for New York and Boston.



FIG. I
THE WARDS OF THE CITY

The average annual precipitation for New Haven is 47.2 inches, 2.4 inches more than for Boston and 3.5 inches more than for New York. The mean relative humidity at 8 a.m. is 76 per cent of saturation, the same as for New York and 3 per cent more than for Boston. The 8 p.m. observations on the other hand are distinctly higher for New Haven as indicated below.

RELATIVE HUMIDITY AT 8 P.M.

	New Haven	New York	Boston
Winter	72	71	70
Summer	79	71	73
Year	74	71	71

The greater amount of precipitation in New Haven is due to the impact of winds coming from the south along the coast and striking the shore of Connecticut as it extends across their path to the eastward. The high relative humidity is in part due to the same cause, and in part perhaps to the steady but moderate winds which prevail, particularly from the sea.

The hills which surround the city shelter it to some extent from strong winds but tend to produce moderate breezes from the sound by the rising of the air which becomes warmed in the enclosed area between them. The prevailing direction of the wind is from the northwest, the average wind velocity for 1910-14 being 9.1 miles per hour. The reported velocities for Boston and New York are much higher, 10.6 and 15.5 miles, respectively, although these figures are not strictly comparable since the Boston and New York instruments are located at a greater elevation above the ground.

New Haven then has a climate typical of the New England coast, its local peculiarities being a somewhat higher precipitation, higher atmospheric humidity and lower wind velocity than normal.

B. THE SANITARY CONDITION OF THE CITY

The Homes of New Haven

The housing problem has for some years received the serious attention of public-spirited citizens of New Haven, and particularly of the Civic Federation. Document No. 6 of the Civic Federation series (Improved Housing for Wage Earners, January, 1911) and Document No. 12 (Housing Conditions in New Haven, by Carol Aronovici, October, 1913) deal directly with this subject; while Document No. 11 (An Industrial Survey of a New Haven District, by H. P. Fairchild, April, 1913) and Document No. 14 (Living Conditions Among Negroes in the Ninth Ward, New Haven, by C. W. Burton, December, 1913) bear upon it less directly.

Document No. 6 contains a forceful statement by Mr. Lawrence Veiller, Secretary of the National Housing Association, following a cursory inspection of certain local housing conditions in July, 1910; while Dr. Aronovici's report includes the results of a somewhat extensive housing survey made in 1912. Mr. Veiller emphasizes the evils of dirty back yards due to inadequate garbage collection, of outside privy vaults, of cellar dwellings and overcrowding. Dr. Aronovici stressed particularly room congestion, defective fire escapes, and insanitary toilet facilities. He showed that room overcrowding in the tenement districts of New Haven (138 persons per 100 rooms) was more acute than in similar districts in Fall River, Buffalo and Stamford, and less serious than in Waterbury, while the average rent per room was higher in New Haven (\$2.67 per room) than in either of the other four cities used for comparison. Of fire escapes Dr. Aronovici says: "The adequacy of the fire escapes where provided must be seriously challenged, and in the cases where provisions are made they were found to be in a very serious condition of neglect and disrepair. Out of a total of 77 buildings in which fire escapes were provided, 22 were found seriously deficient." Of the toilets examined 43 per cent were found to be "dirty" and 7 per cent "filthy"; 32 per cent were recorded as "gloomy" and 33 per cent as "dark"; three-fifths were poorly ventilated or not ventilated at all.

New Haven has at present in round numbers 3200 tenement houses located principally in Wards 3, 5, 6 and 7, and more recently in Ward 9, in the vicinity of the Winchester Repeating Arms Company. The population per acre in 1915 was 54.6 in Ward 7, 38.9 in Ward 6, 33.2 in Ward 3, between 18.9 and 28.5 in the other wards of the older city and between 1.7 and 2.6 in Wards 13, 14 and 15.

Housing conditions in Connecticut are mainly governed by two acts

called The Tenement House Act and An Act Concerning Sanitary Conditions in Tenement Lodging and Boarding Houses. These acts were passed in 1911 and amended and strengthened in 1913 as a result of Dr. Aronovici's report and the activity of the Civic Federation of New Haven. The first of these acts (Chapter 241, Acts of 1911, amended by Chapter 23, Acts of 1913), which deals mainly with structural conditions, is in most respects still very far behind the standard set in the Model Tenement House Law prepared by Mr. Lawrence Veiller of the National Housing Association. Thus the Connecticut law permits 90 per cent of a corner lot and 70-75 per cent of other lots to be built upon instead of 80 per cent and 60 per cent, respectively, specified in the Model Law; and there is no limitation at all set upon houses running from one street to another on a lot 100 feet or less in depth. The yards behind a two-story house may be 11 feet deep against a minimum of 15 feet in the Model Law, and an outer court may be 4 feet in width for a two-story house against a minimum of 10 feet in the Model Law. The Connecticut law specifies that each apartment shall contain one room of at least 120 square feet floor area and that other rooms shall have at least 70 square feet floor area and that the height of rooms shall be 8 feet 6 inches; the corresponding figures in the Model Law are 150 feet, 90 feet and 9 feet, respectively. The section of the Connecticut law dealing with the natural lighting of halls is particularly weak, there being practically no requirement for the upper two stories of a three-story building. The provision in regard to water closets is also unsatisfactory since it requires one water closet only to be provided for two apartments of less than three rooms each. Furthermore it permits the opening of the toilet room upon a dark shaft with light only from other rooms in the apartment. The Model Law requires, and decency and sanitation demand, that toilets should be provided within each apartment, and that all should have windows opening on street, yard or court.

The law in regard to fire escapes (Sections 2628 and 2629 of the General Statutes and Chapter 10, Public Acts, 1909, as amended by Chapter 239, Public Acts, 1911) is also unsatisfactory as regards buildings of three stories in height or less, since for such buildings it does not require any fire escape if there are two interior stairways in the building and does not specify the nature of the outside fire escape, if any. The Model Law requires and safety demands fireproof outside stairways or outside stairway and balcony fire escapes of stone, concrete or iron.

The Act concerning Sanitary Conditions in Tenements (Chapter 220, Acts of 1911, amended by Chapter 29, Acts of 1913) contains the following very broad provision which might apparently be made the basis for sweeping action, in regard to sanitary conditions in existing buildings.

"Whenever any tenement, lodging, or boarding house, or any building, structure, excavation, business pursuit, matter, or thing in or about such house or the lot on which it is situated, or the plumbing, sewerage, drainage, light, or ventilation of such house, is, in the opinion of the Board of Health, in a condition which is, or in its effects is, dangerous or detrimental to life or health, said board may declare that the same, to the extent specified by said board, is a public nuisance, and may order the same to be removed, abated, suspended, altered, or otherwise improved or purified, as the order shall specify. The Board of Health may also order or cause any tenement house, or part thereof, or any excavation, building, structure, sewer, plumbing pipe, passage, premises, ground, matter, or thing in or about a tenement, lodging, or boarding house, or the lot on which such house is situated, to be purified, cleansed, disinfected, removed, altered, repaired, or improved. If any order of the Board of Health is not complied with, or so far complied with as said board shall regard as reasonable, within five days after the service thereof, or within such shorter time as said board shall designate, then such order may be executed by such board, through its officers, agents, employees, or contractors, and the expense thereof shall be collected from the owner by an action in the name of the city, borough, or town."

Other specific provisions in the Act provide in strong terms for cleanliness, require a supply of water on every floor (where water pipes are accessible) and adequate and suitable privy vaults and water closets for every two apartments of three rooms or less and one for every apartment of four or more rooms.

In regard to the lighting of halls the Act is weak, only requiring that the owner shall "provide for the lighting of all public halls at night," a provision sometimes complied with by placing a candle or an oil lamp in the hallway, a dangerous proceeding from the standpoint of fire risk,—if the candle or lamp were lighted. The Model Law requires that "a proper light shall be kept burning by the owner in the public hallways, near the stairs, upon the entrance floor and upon the second floor above the entrance floor of said house, every night from sunset to sunrise throughout the year, and upon all other floors of the said house from sunset until ten o'clock in the evening." With this exception, however, the law governing maintenance of existing tenements seems to be a reasonably satisfactory one.

An important step toward a higher standard of housing was taken in March, 1916, by an amendment to Section 224 of the Municipal Ordinances of New Haven prohibiting the construction of frame tenements of three stories (three decker tenements). During the four years, 1912-15, permits were issued for 505 tenements for three or more families



FIG. II

A CASE OF LOT OVERCROWDING

In the house on the right there is one interior room, opening on the narrow slit between the two buildings, and another completely dark room with no window at all.



FIG. III

**AN OLD DWELLING HOUSE CONVERTED
INTO A TENEMENT**

A single hall water closet serves for twenty people

of which 422, or 84 per cent, were frame dwellings, while of the 163 such houses built during the last of these years, 1915, 153, or 94 per cent, were frame. As Dr. Wright, Health Officer of New Haven, pointed out at this time, frame tenements are not only more dangerous from the standpoint of fire risk, but since they involve a smaller investment they are much less likely to be well equipped and maintained from a sanitary standpoint.

In regard to the general housing problem and particularly in regard to the actual conditions in 1916, we have had the assistance of Mr. L. S. Kelley of Yale College, to whom we wish to express our appreciation of his valuable services. Mr. Kelley visited some 200 tenements, and 49 houses containing 280 tenements were personally inspected by two of us (C.-E. A. W. and D. G.). General lot overcrowding does not appear as yet to be serious except in a few instances (see Fig. 2); and rooms as a rule are well lighted and ventilated. Serious evils of this kind will, however, undoubtedly arise in the future as the city grows, evils not fully guarded against by the somewhat lax provision of Chapter 23 of the Laws of 1913. Dark hallways are far too common, particularly in the old buildings. Thus in the Sixth Ward, 4 buildings out of 11 had dark halls and in the Second Ward, 8 out of 19, while halls in 19 houses in the Ninth Ward were all well lighted. Common hall toilets instead of toilets in the apartments are almost universal in the older houses and many of them are almost wholly dark, as shown by the table below.

	Total apartments inspected	With Hall Toilets	With Dark Toilets
Ward 2	124	74	39
Ward 6	52	40	0
Ward 9	104	24	21

Some of the worst conditions are found, as would naturally be expected, in old dwelling houses which have been converted into tenements without necessary structural changes (see Fig. 3).

Dark hallways offer direct incentives to immorality. Hall toilets, even when provided with a window of translucent glass opening on the stairs or on a room and with the ventilating shaft of 36 square inches area required by the law, are frequently almost wholly dark and when dark are naturally often in so filthy a condition as to constitute a serious menace to the public health.

The other very serious defect noted was the lack of adequate fire escapes. As indicated below, a large proportion of houses have no outside stairway or fire escape at all, and most of the remainder are equipped only with outside balconies and wooden stairways. The inspection of

tenements for fire escapes is in the hands of the Building Inspector, and he reports the erection of more than 400 new fire escapes in 1915. Under the provisions of the state law, however, it does not appear possible to require proper outside fire escapes of iron for the three-story buildings, which constitute the bulk of New Haven tenements.

	Total apartments inspected	With no outside fire escapes or stairways	With wooden outside stairways
Ward 2	124	40	60
Ward 6	52	48	0
Ward 9	104	56	18

Conditions in regard to room overcrowding can only be determined by night inspections. Mr. J. J. O'Donnell, Tenement House Inspector, informs us that such inspections, as made by him, have failed to reveal any serious conditions of this kind, and information gathered from various other sources tends to support the view that even the recent great additions to the industrial population of New Haven have been absorbed without serious difficulty. The male lodging house problem has never become a grave one in this city.

One of the most important results of the Civic Federation movement of 1913 was the appointment of a Tenement House Inspector under the Board of Health to devote his whole time to the supervision of housing conditions. Mr. J. J. O'Donnell has held this position for the past three years. We have had ample opportunity to observe his methods and to study the very careful records kept. In 1915, 7946 houses were inspected (amounting to a semiannual inspection for each house), 2321 new orders were issued, 2221 old orders complied with, 244 new toilets installed, 312 old toilets ventilated, and 1165 night inspections made in regard to the lighting of halls. We have been impressed with Mr. O'Donnell's tact and efficiency and with the coöperative spirit his educational efforts have called forth.

Conditions are by no means ideal in the tenements of New Haven. It must be remembered, however, that housing conditions form merely the most obvious aspect of the general problem of poverty which cannot be solved in any easy way. Twenty-five hundred of the 3200 tenement houses in New Haven were built prior to the Tenement House Law of 1913 and economic considerations make it impossible to remodel existing tenements in any radical degree. So far as the sanitary conditions in existing tenements go, we are inclined to believe that Chapter 29 of the Acts of 1913 is reasonably adequate and that its enforcement is as thorough as could practically be expected. The Board of Health should,

however, be provided with a larger appropriation for the summary abatement of grave nuisances in order to avoid legal delays imposed by a few stubborn offenders. We feel that the clause in relation to the lighting of halls is unsatisfactory and that the failure to require outside iron fire escapes on three-story tenements involves serious danger. The main thing is to control the future and to guard against the indefinite perpetuation of bad housing conditions. This, it seems to us, the Tenement House Law governing the construction of new buildings does not adequately ensure. It is always a complex problem to know just how far one may safely go in such matters, but we feel that the possibility of strengthening the housing laws should receive serious consideration. We therefore make the following recommendation.

Recommendation I. That the Committee on Tenement House Conditions of the Civic Federation investigate the present Housing Laws of Connecticut and consider the advisability of strengthening them along the lines of the Model Housing Law, or of supplementing them by more exacting municipal ordinances, particularly so as to guard against lot overcrowding, dark halls and dark toilets, in new buildings, and to provide for adequate fire escapes in both new and old buildings.

The elimination of bad housing conditions is of little value if better substitutes are not provided; and legal regulation should go hand in hand with an organized effort to provide model homes. The most important step yet taken in New Haven along this line was the organization as a result of the Civic Federation agitation of 1913 of The Improved Housing Association and the construction of a group of model homes at the corner of View and Willow Streets. The block includes eight two-family houses, each apartment containing a living room, two bedrooms, a kitchenette, a bathroom and sleeping porch, with cellar storage rooms (see Fig. 5). Rentals are \$12 a month. The Improved Housing Association is incorporated with a capital of \$50,000 and dividends are limited to 5 per cent. Dividends of 4 per cent were paid during the first year and of 4½ per cent during the second year. We believe this plan of providing ideal housing conditions on a basis of moderate interest return offers the ideal solution of the housing problem; but many hundreds of such houses are required, not sixteen; and in particular there is need for tenements which will accommodate at a moderate rental larger families than can be provided for in the View and Willow Street block. We therefore make the following:

Recommendation II. That the Committee on Tenement House Conditions of the Civic Federation inaugurate a systematic campaign for the widest possible extension of the activities of The Improved Housing Association to the end of providing through private endowment for more

model homes; and that the Committee give consideration to the possibility of securing from the city government appropriations for municipal tenements such as have been so successfully operated by European municipalities.

Problems of Industrial Hygiene

According to the returns of the thirteenth census, New Haven had in 1909 sixteen different industries, each with an annual output valued at over a million dollars. These were as follows: The manufacture of automobiles, including bodies and parts; boots and shoes, including cut stock and findings; boots and shoes, rubber; boxes, fancy and paper; bread and other bakery products; clocks and watches, including cases and material; confectionery; corsets; firearms and ammunition; foundry and machine shop products; gas, illuminating and heating; malt liquors; printing and publishing; rubber goods; slaughtering and meat packing; and tobacco manufactures.

Of these the manufacture of firearms and ammunition and of foundry and machine products which are by far the largest would be expected to contribute a considerable quota of industrial accidents. The making of munitions, rubber boots and shoes and of other rubber goods, and the smaller industries of brass and bronze (7 establishments in 1909) and electroplating (3 establishments in 1909) involve the use of dangerous industrial poisons. Grinding and buffing, processes which are in use in many of the industries mentioned, cutlery and tool making (6 establishments in 1909) and marble and stone work (10 establishments in 1909) unless special precautions are taken, expose the workers to the inhalation of hard dust particles which form an important predisposing cause of industrial tuberculosis, while printers and tobacco workers are likely to suffer from an excessive incidence of this disease as a result of general bad ventilation and a continuous stooping posture while at work.

It is, of course, quite impossible without exhaustive special studies to obtain any idea of the amount of industrial tuberculosis in a given locality. All that can be said is that judging from broad statistical evidence and experience elsewhere the risks in the industries mentioned must be considerable except in shops which have introduced the most modern systems of prevention. As to industrial poisonings we are somewhat better off, for the reporting of occupational diseases to the Commissioner of Labor Statistics is required by Chapter 159 of the Acts of 1911. Here as elsewhere such laws are very incompletely complied with. In 1914, 12 cases of lead poisoning were reported from New Haven, nine among wire workers, and one each among munition workers, clock makers and cigar



FIG. IV

A DANGEROUS FIRE ESCAPE

This fire escape is in a closed court from which there is no means of egress except through the buildings. Its lower point of attachment was completely rusted away so that it could be pulled away from the wall as shown in the picture. Note also rubbish in the court.



FIG. V

ONE OF THE BEST FRUITS OF NEW HAVEN'S CIVIC SPIRIT

The block of model homes at View and Willow Streets

makers, besides one case of brass poisoning and several minor ailments. In 1915 and 1916, however, only seven cases of occupational poisoning were reported from New Haven out of a total of 129 received from the state at large, a most gratifying result which suggests that steps have probably been taken to secure more effective protection. These seven include five cases of lead poisoning (a wire worker, a munition worker, a painter, a paper hanger, and a saloon keeper). The accident reports made to the Board of Compensation Commissioners are not classified by towns, but in the third district, which includes New Haven as its largest unit, 7659 injuries were reported between November 1, 1914, and January 1, 1916.

Connecticut is fortunate in having a good Workmen's Compensation Act, although one which is somewhat less liberal in certain of its provisions than the Federal Act or the corresponding laws of Massachusetts, New York, Ohio and Illinois. The Supreme Court of Errors decided in April, 1916, that "personal injury" in the Act was limited to accidents and did not cover occupational diseases.

The state laws designed directly to secure health and safety in factories are on the other hand decidedly defective. It is provided in general terms that "all factories and buildings where machinery is used shall be well lighted, ventilated and kept as clean as the nature of the business will permit"; that "the belting, shafting, gearing, machinery and drums of all factories and buildings where machinery is used, when so placed as, in the opinion of the inspector, to be dangerous to the persons employed therein while engaged in their ordinary duties, shall, as far as practicable, be securely guarded" (both provisions from Section 4516, General Statutes of 1902); and that "every employer whose business requires the operation or use of any emery, tripoli, rouge, corundum, stone, carborundum, or other abrasive, polishing, or buffing wheel, in the manufactures of articles of metal or iridium, or whose business includes any process which generates an excessive amount of dust, shall install and maintain in connection therewith such devices as may be considered necessary by the factory inspector and state board of health to remove from the atmosphere any dust created by such process" (from Section 1, Chapter 208, Public Acts of 1913).

There is no provision whatever in regard to industrial poisonings; and the sections in regard to light and ventilation have no force unless specifically interpreted by experts. The enforcement of the laws is entrusted to six deputy inspectors (besides two female deputies, whose duties are limited to the supervision of conditions surrounding the employment of women, "machinery, appliances or fixtures, except sanitary fixtures," being specially excluded from their purview). No special qualifications are

laid down by the law for the male deputies and the power of the Civil Service Commission to establish technical qualifications is nullified by the almost universal practice of securing exemptions. Although the deputies have undoubtedly acquired a knowledge of the art of safeguarding machinery, there is no reason to suppose that they are in any way competent to determine whether a given factory is "well lighted" and "ventilated," problems which require the application of refined physical and chemical tests. Neither the State Department of Labor and Factory Inspection nor the State Board of Health so far as we are aware has at present the special technical knowledge necessary to make specific recommendations for the carrying out of even the provisions in regard to dust removal.

Two things are now generally recognized as essential in order to secure adequate protection of industrial workers against the insidious dangers of occupational disease. First there is necessary an Industrial Council with power to formulate specific regulations for carrying out the general provisions of the law. It is well that the statutory provisions should be general as they are in the Connecticut law, but they must be interpreted by a small expert body as is now the case in Massachusetts, New York, Wisconsin and other states. Such a Council should represent employers, employees, the public, and the science of industrial hygiene, and should be entrusted with the task of defining for different classes of work good ventilation, good light, and adequate dust removal and of formulating regulations for the prevention of occupational poisonings.

In the second place it is essential that laws in regard to light and ventilation, dust removal and occupational poisons, should be enforced by trained experts. The New York, Massachusetts and Ohio bureaus provide for medical experts to supervise the control of the subtle occupational poisonings, chemical experts for air analysis and the study of poisonous dusts, and engineering experts for the study of ventilating and dust removal problems.

These two things, a small expert council for framing regulations, and a force of trained men to carry them out, are the ends to be desired. Just how these fundamental needs can be attained under Connecticut conditions is a problem to be worked out with much care and thought. We therefore suggest:

Recommendation III. That the Civic Federation organize a new Committee on Industrial Hygiene to study the question of securing adequate protection for industrial workers against occupational poisonings, and the dangers of bad ventilation, industrial dusts and other insanitary factory conditions, and present to the Legislature of 1918 a plan for securing these ends; and we suggest that this committee should also direct its atten-

tion to the importance of having appointments in the present Department of Labor made on a merit basis after civil service examination.

It is the opinion of those who have given most careful study to the problem that the organization of a system of health insurance which indirectly stimulates both workman and employer to reduce the risk of occupational disease to a minimum will often do even more than direct legislation to promote the movement for industrial hygiene. We therefore suggest:

Recommendation IV. That the movement for a system of Health Insurance in Connecticut should receive the earnest consideration of the Civic Federation as an important step toward the prevention of occupational and other diseases.

We cannot leave this question of industrial hygiene without a word of appreciation of the steps taken on their own initiative by many of the employers of New Haven in the direction of providing safe and healthful conditions for their employees. The Acme Wire Company, the American Steel & Wire Company, the L. Candee Company, the Connecticut Company, the Geometric Tool Company, the Greist Manufacturing Company, the Hoggson and Pettis Manufacturing Company, the Southern New England Telephone Company, the Winchester Repeating Arms Company, the City Y. M. C. A., and the Yale Industrial Y. M. C. A. are all members of the National Safety Council. The Winchester Repeating Arms Company has a particularly well-worked-out system of accident prevention which has reduced the proportion of serious or lost time accidents from 16 per cent of all accidents in 1913 to 4.9 per cent in 1916. Its Personnel Department includes an employment bureau, an emergency hospital with company physicians and a corps of visiting nurses, employees' personal aid and many other branches of work. The Geometric Tool Company has a first aid room and a social secretary and has paid special attention to factory and personal cleanliness (by the provision of shower baths and the like). L. Candee & Company and the Acme Wire Company have carried the protection of machinery to a high point, and each firm provides a first aid hospital which has proved of great value in reducing danger from accidents, and a graduate nurse who carries on invaluable work in the sanitary and hygienic instruction of employees. In response to our inquiry the Southern New England Telephone Company writes:

"The fundamentals of industrial safety and welfare as practiced by The Southern New England Telephone Co. consist of two principal factors: (1) the construction and maintenance of its plant and equipment under those standard methods which are best known to the art for the elimination of all hazards, and

(2) the education of its employees as to the hazards which may be encountered through careless and thoughtless actions, as well as the methods which should be followed in order to prevent such accidents.

"Rules and instructions for the safety of employees are furnished to each person entering its service; lectures on 'First Aid' treatment are given each year by a competent physician, followed by 'First Aid' contests in which all employees are encouraged to enlist; and monthly bulletins are issued to explain the most prevalent kinds of accidents with the proper methods for their future prevention."

The Greist Manufacturing Company has paid special attention to hospital treatment of injuries and factory cleanliness. Mr. H. M. Greist writes:

"We find that the best thing we have ever done for the health and happiness of our employees was the change of our working hours from 6 days of 9 hours each to 5 days of 9½ hours each and 1 (Saturday) half day of 5 hours."

The Public Water Supply

The provision of an adequate supply of pure water is the first essential of municipal sanitation. In New Haven the public supply is furnished by the New Haven Water Company, the city paying a lump sum for its service. The water supply is very generally distributed, except in the outlying districts of the thirteenth, fourteenth and fifteenth wards, and private wells are very rare. Our special investigator, Mr. D. O'Brien, found a few dug wells on Crescent and Fitch and adjoining streets in Ward 13. These should be eliminated as rapidly as possible.

In the central part of the city the various supplies are mixed in the pipes, and the same house may be supplied from one or another source, depending on varying draught in various sections.

The public water supply includes four principal systems which enter the city by the mains shown in Fig. 6, while a fifth supply from the Maltby Lakes serves a small part of the West Chapel Street section as well as the town of West Haven. The first three of the main supplies are drawn from Lakes Saltonstall, Whitney and Wintergreen, respectively, the fourth or Woodbridge supply from Lakes Dawson, Chamberlain and Glen. Up to 1902 all of the water was used without purification. In this year a sand filter was installed at Lake Whitney as a result of a serious

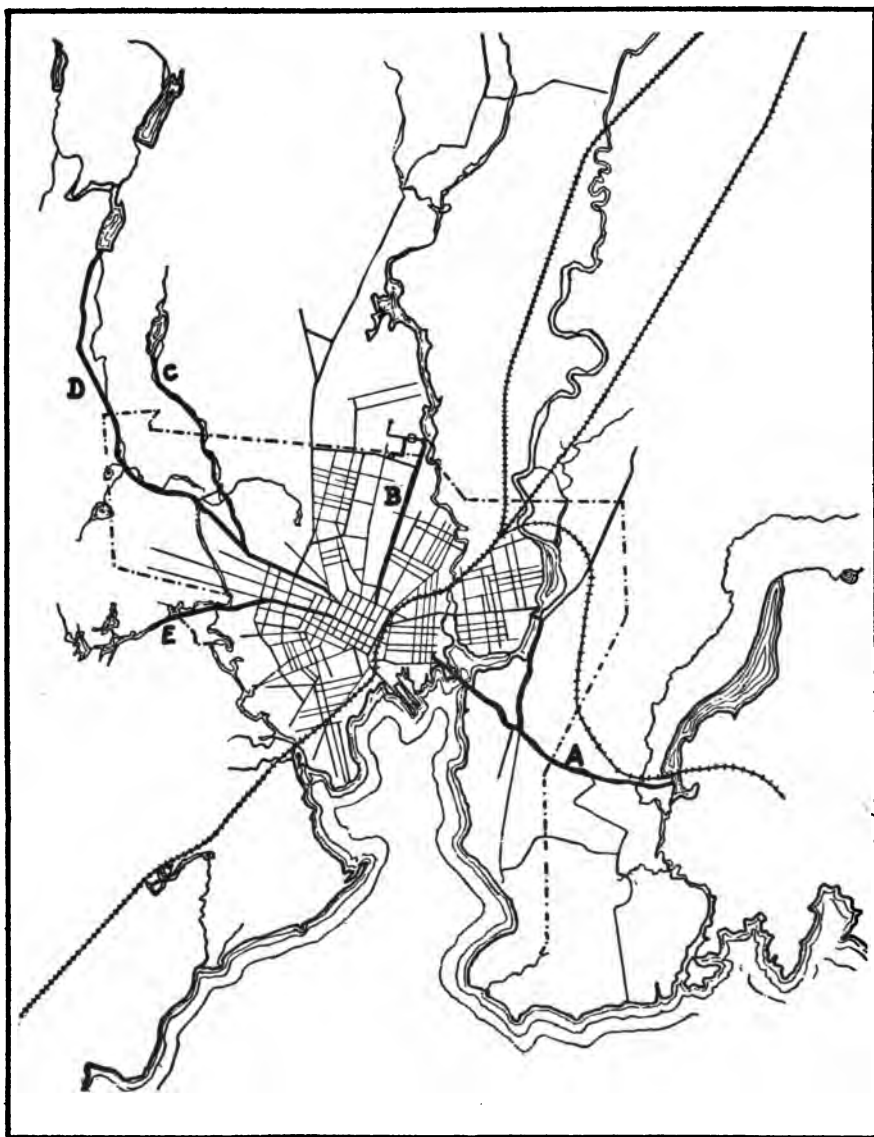


FIG. VI

THE WATER SUPPLY SYSTEMS OF NEW HAVEN

A, Saltonstall; B, Whitney; C, Wihntergreen; D, Woodbridge (Lake Dawson); E, Maltby

typhoid epidemic, which was definitely traced to the Woodbridge supply. More recently (in 1912) a chlorination plant has been installed at the Woodbridge reservoir. The Saltonstall, Wintergreen and Maltby supplies receive no purification except that which they gain by storage.

The Lake Whitney watershed covers 37.7 square miles; that of Lake Saltonstall 20.2 square miles; Lake Wintergreen 1.1 square miles; the Maltby Lakes 13.3 square miles, and the Woodbridge supply 13.6. The population on the watersheds of Lakes Wintergreen, Maltby and Saltonstall, the only supplies without purification in addition to storage, is 16,757.

Lake Whitney furnishes 12,000,000 gallons daily; Woodbridge supply, 9,000,000; Lake Saltonstall, 6,000,000; and Lake Wintergreen, 1,000,000—a total of 28,000,000, which means a consumption of 180 gallons per capita per day. This consumption is about three times what it should be, and in the interests of economy a system of metering should be introduced. Any excess over a consumption of 50-60 gallons per capita per day is always found to be due to waste through leaking fixtures and leaking street mains, and the installation of meters soon leads to the detection of such waste and its elimination without any limitation on legitimate use.

The Lake Whitney sand filters have now been in operation for 14 years and have yielded excellent results under the able superintendence of Mr. O'Connor. The system of purification of the Woodbridge supply by chlorination is also entirely satisfactory. The other three supplies, as pointed out above, are improved by storage and are protected by a very thorough system of sanitary patrol and by the ownership by the company of a considerable portion of the watershed. Such precautions are good, but they do not, and cannot, ensure a wholly safe supply. No amount of patrolling can prevent occasional pollution by picnickers, tramps, or by those using the roads near the reservoirs. The factor of safety offered by storage may at any time be nullified by sudden rushes of rain or melting snow or by currents induced by wind, such as caused the epidemic of typhoid at Auburn, N. Y., in 1908. New Haven cannot afford to run even a slight risk of repeating the disastrous experience of 1901.

Our laboratory examinations of the various supplies bear out the conclusion that the three unpurified supplies are not at all times entirely safe from a sanitary standpoint.

During November and December, 1916, a series of samples was examined on 29 different days for the colon bacillus, the characteristic microbe of the intestine. As indicated in the table below, this organism was found but once in the disinfected Woodbridge water (in two out of five one c.c portions examined), but twice in the filtered Whitney supply (once in one

and once in two out of five one c.c. portions examined); while it was isolated on four days from Saltonstall, on five days from the Maltby supply, and on seven days from the Wintergreen supply. The colon bacillus may occasionally be isolated in one or two out of five one c.c. portions without the result being significant, but the Wintergreen and Maltby results tabulated below indicate that these waters at times

BACTERIOLOGICAL EXAMINATIONS OF NEW HAVEN WATER

Number of Days on Which B. Coli Was Isolated

	Number of one c. c. portions showing positive results on a given day					
	0	1	2	3	4	5
Saltonstall	25	4	—	—	—	—
Wintergreen	21	4	2	—	1	—
Woodbridge	27	—	1	—	—	—
Whitney	25	1	1	—	—	—
Maltby	23	3	1	—	1	—

show evidence of pollution in amounts which are not considered admissible by such standards as those laid down by the U. S. Public Health Service for drinking water served on interstate railroad trains. It is true that most of the colon bacilli in these waters do not come from sewage but from the washings of fertilized land, roadways and the like. Our studies of the typhoid death rate of New Haven do not indicate that the water supply has been recently in any way responsible for its causation. It is a possible future danger, not a present one, we have in mind, but a danger which an unhappy combination of circumstances might at any time make an actual one.

It is the clear consensus of opinion of competent sanitarians that sanitary patrol and storage alone cannot generally be relied upon to furnish a safe water supply in thickly settled regions like those of southern Connecticut, and that additional measures of purification should be provided. Fortunately in chlorination, as now applied to the Woodbridge supply, we have an effective safeguard at a cost so low as to be wholly negligible. We therefore urge:

Recommendation V. That steps be taken to secure at all times the complete safety of the New Haven water by providing for the treatment by chlorination of the Saltonstall, Wintergreen and Maltby supplies.

Sewerage and Sewage Disposal

The prompt removal of excretal wastes by means of public sewers is another of the primary essentials of municipal sanitation, and the danger of transmission of disease from improperly constructed privy vaults is

an obvious and important one. Excellent progress toward the elimination of such vaults has been made in the more closely settled regions of New Haven. The older twelve wards are now sewered with reasonable completeness and it is estimated by the Board of Health that not over fifty vaults now exist on sewered streets. Our special inspector, Mr. O'Brien, has checked this estimate by going over certain selected districts and believes the estimate to be a conservative one. For instance, only five privies were found in the section of the second, third and fourth wards bounded by Park, George and Meadow Streets, Columbus and Howard Avenues; and six in the sewered part of Ward 9 and some of the sewered part of Ward 10. In the unsewered parts of Wards 9 and 13, in Fair Haven, especially in the Westville district, on Crescent, Watson, Daisy, Bassett and Shepard Streets, the privy problem is, however, a serious one.

In all, nearly 400 privies were inspected by Mr. O'Brien, including 39 on Crescent, Fowler, Fitch and adjoining streets in Ward 13, 50 in the region bounded by Prospect Street, Dixwell Avenue and Munson Street (Ward 9), 123 in Ward 14 (Fair Haven), 28 in the Westville district (Fountain, Dayton, Emerson and Harrison Streets), and 123 in Ward 15 (Lighthouse, Morris Cove and Granniss Corner districts). He reports the privies in the Fair Haven district to be in particularly bad condition, two-thirds of them being in some way "exposed to flies, rats or other insects or vermin." In general, "of the vaults examined, over 50 per cent were in some way exposed to flies and other insects. Of these, most cases were those of uncovered seats, while many had unscreened windows, open doors, large cracks, and quite a few were openly exposed at the bottom. Some had a combination of all these faults."

flies
The dangers from such an open exposure of excreta as is shown in Fig. 7 is too obvious for discussion. Flies will resort to such a place in great numbers and will carry pollution to food in the neighboring houses. Only the presence of specific discharges from a typhoid case or a carrier is needed to initiate a serious epidemic; and Dr. Lewis, Bacteriologist of the Department of Health, has actually traced a considerable number of typhoid cases to this cause. Such filthy interior conditions as are shown in Fig. 8 constitute an equally serious menace.

Pending the extension of the sewerage system and the gradual enforcement of sewer connections on sewered streets we believe that the condition of existing privy vaults should receive very serious consideration. Even a privy vault can be made reasonably sanitary with sufficient care. We therefore urge:

Recommendation VI. That an ordinance be passed requiring all privies to be tightly constructed, screened against flies, and maintained in a sani-



FIG. VII
A DANGEROUS OPEN PRIVY



FIG. VIII
FILTHY INTERIOR OF A PRIVY

tary condition; and that a special inspector be detailed to supervise the enforcement of these regulations.

The main trunk sewers and outlets of the sewerage systems of New Haven are shown in Fig. 9. There are 129.58 miles of sewers and it is estimated that there are about 20,000 connections, 18,904 having been actually recorded between 1871 (when the records begin) and 1916. The system is built on the combined plan to take both house sewage and storm water as was the practice until recent times, but the sewers were well designed and in general may be considered adequate and satisfactory. At times of heavy rain the flow backs up in the 36-inch sewer on Church Street between George and Grove and causes flooding of cellars, a condition which can be ameliorated, though not wholly removed, by plans which have been prepared by the City Engineer's Office. The Whalley Avenue Boulevard sewer is also somewhat overcharged.

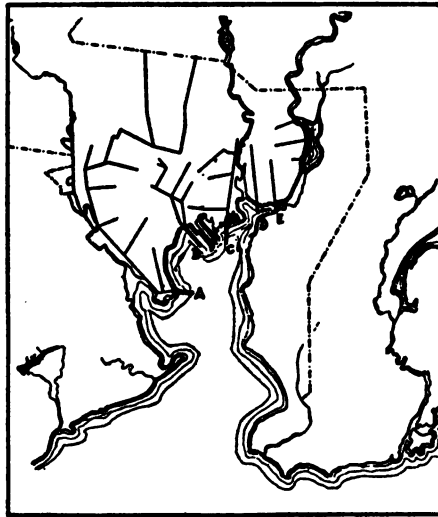


FIG. IX

THE PRINCIPAL SEWERS OF NEW HAVEN

A, Sea St. outlet; B, Meadow St. outlet; C, East St. outlet;
D, Poplar St. outlet; E, James St. outlet

The next large project to be undertaken is the sewerage of the northern half of Westville. Plans have been drawn for a separate system in this region to connect with an extension of the 60-inch Whalley Avenue sewer, the storm water drains to discharge into West River. Eighty thousand dollars has been appropriated to begin this work, which is already under way. In connection with the general problem of sewer

extension we desire to endorse the recommendation of Dr. Wright that the Board of Health should have a voice in selecting the streets to be sewerred in the order that, in its opinion, necessity demands.

Sewerage offers the one wholly satisfactory solution of the difficulties of the individual householder; but it creates a new municipal problem, that of sewage disposal, one of the largest and most pressing civic problems which New Haven must face in the immediate future.

Aside from many small private sewers there are five large public sewers which discharge into New Haven harbor at the points indicated in Fig. 9. At Sea Street on the west side of the harbor about 3,600,000 gallons a day are discharged; at Meadow Street, 1,700,000 gallons and at East Street, 13,600,000 gallons, both near the head of the harbor; while two smaller sewers discharge into the Quinnipiac River at Poplar Street (850,000 gallons) and James Street (2,450,000 gallons). These figures are from gaugings made during August, 1916, under the direction of Albert B. Hill, Consulting Engineer.

Much of New Haven harbor is shallow, particularly in the vicinity of the Sea Street outfall. The outfalls are all above low-water mark, and the sewage as it spreads over the flats and deposits its solid sludge upon them produces a condition of gross nuisance; while the presence of the untreated sewage constitutes a grave menace to the health of those who bathe in the harbor or consume shellfish grown therein.

During the past summer the sanitary condition of the harbor was exhaustively studied by a corps of experts from the U. S. Public Health Service. Dr. Hugh S. Cumming, Surgeon in Charge, has made the following report to Dr. Wright in regard to these investigations.

"The investigation has included:

"1. Observation of the origin and character of the discharge from the various sewer outfalls.

"2. Observations of floats set near the outfalls and of feces and other floating matter discharged therefrom, with reference to the direction and distance traveled by them over various periods of time and tide.

"3. Laboratory examinations of approximately one thousand eight hundred samples of mud, water and shellfish taken from all parts of the harbor.

"As a result of the investigations so far made, the following conclusions have been reached:

"1. That the harbor of New Haven, and the tidal portions of the Quinnipiac, West and Mill Rivers above the line between Bradley Point and the Old Tower are grossly polluted by sewage discharged from the sewer outfalls in the harbor.

"2. That the portion of the harbor which lies below the above line and within the breakwater contains a smaller proportion of pollution because of the dilution at each incoming tide and the sedimentation of some of the sewage before it reaches the area.

"3. All of the first described area, and probably all of the second, certainly that portion adjacent to the channel, receives sewage, including human feces, within one tide, or about six hours after its discharge from the sewer outfalls. The sewerage system of New Haven is so constructed that sewage is discharged unusually fresh and before disintegration has taken place.

"4. The direction of flow and distance traveled by sewage from any outfall is determined by the combined action of the tide and wind.

"5. Shellfish in the harbor are exposed to pollution by sewage from the city and are filthy, dangerous and unfit to be eaten as taken from the area.

"Owing to their greater physiological activity during warm weather, the danger of conveying infectious pollution is greatest during such periods, and the eating of uncooked shellfish taken from along the fore shore and in the immediate vicinity of sewer outfalls is particularly dangerous to health.

"There is no sanitary reason why shellfish should not be grown in the harbor if they be transferred to unpolluted waters for a period of about ten days before they are taken as food.

"6. Bathing and swimming in the waters of the harbor above the line between Old Tower and Bradley Point, and in the rivers is unsafe and should be prohibited. The practice, which seems common, of bathing in the rivers and along the fore shores in the vicinity of sewer outfalls is especially dangerous.

"The dike at Sandy Point diverts grossly polluted waters from the sewer outfalls above that point, toward and into Morris Cove; floats and pieces of feces have been followed from the outfalls to the bathing beaches at Fort Hale and in Morris Cove, including the vicinity of the Yacht Club.

"The sewage along the shore from Savin Rock to Bradley Point comes in part from the sewer outfall of the West Haven Disposal Plant, though it is probable that some of it comes from the city sewer outfalls as has been shown by the float which traveled from the City Point outfall to Cox's Beach within eight hours.

"Briefly, I recommend that the taking of shellfish from the harbor of New Haven be prohibited, except under precautions as will insure that they will not be used as food until after purification.

9 "That the bathing in the grossly polluted, filthy waters of the harbor and rivers be prohibited.

"That the city continue to take such appropriate steps as will eventually insure the proper disposal of its sewage."

We believe all of these findings to be fully justified; and urge as

Recommendation VII. That pending the treatment of the city sewage the taking of shellfish from the harbor of New Haven be prohibited except under such precautions as will ensure adequate purification before they are used as food,

and as

Recommendation VIII. That pending the treatment of the city sewage bathing be prohibited in the more grossly polluted portions of the harbor, the limits of the prohibited area to be defined by the Board of Health.

Other Cause
not known
relative
value

We would particularly call attention to the fact that New Haven suffers from an excessively high typhoid fever death rate, and that our special studies of the local prevalence of the disease indicate that the cases are specially concentrated in those water-front wards immediately adjacent to the sewer outlets. From these facts as well as from the seasonal and age incidence of the disease we are inclined to believe that an appreciable amount of the typhoid infection in New Haven may be due to bathing in these polluted waters. The purification of shellfish and the limitation of bathing are at best but temporary palliative measures. New Haven cannot abandon the harbor, which should be its chief natural beauty and its pleasure ground, to be a public nuisance and a breeder of disease. An appropriation has been made for a channel to be dredged out to the main channel from the Sea Street outlet, which is to be submerged well below the surface of the harbor. This procedure may help matters somewhat, here and at the other outfalls. What is really essential, however, is the treatment of the sewage. Complete purification to the point of oxidation of all the organic matter is by no means essential, for it is estimated by Mr. Kellogg of the City Engineer's Office that the tidal prism in the whole harbor is 300 times the sewage flow, which means that the natural digestive capacity of the harbor should be ample to care for the soluble materials present. The suspended solids should, however, be removed to avoid sludge deposits and local nuisances, and as a preliminary to chemical disinfection, which will make the harbor safe for taking shellfish and for bathing. The exact process which will prove most efficient and economical for securing these ends must be determined by special study, and the City Government has placed \$11,000 at the disposal of a special Aldermanic and Citizens' Subcommittee for an investigation of the subject. An Experiment Station is being built at the East



FIG. X
BACK YARDS BEFORE THE SPRING CLEAN-UP



FIG. XI
A COURT IN A CROWDED TENEMENT DISTRICT

Street outfall, to be operated under the direction of Prof. S. E. Barney of the Sheffield Scientific School and one of us (C.-E. A. W.). We would urge:

Recommendation IX. That so soon as the experiments on sewage disposal are completed the sewage of the city should be treated as promptly as possible by such means as seem best adapted to eliminate local nuisances and render the harbor waters safe for bathing and for the taking of shellfish.

Collection and Disposal of Garbage and Refuse

The systematic collection of garbage was first instituted in New Haven in 1876 through the efforts of that pioneer sanitarian, Prof. W. H. Brewer. It was first placed under the control of the Board of Health, but with a growing realization of the fact that the handling of municipal wastes is rather an engineering than a health problem, it was, in 1915, removed, at the request of the Board of Health, from the jurisdiction of the Board and placed under the Department of Public Works.

At present the collection of garbage is carried out by the city itself in the region between Chapel Street on the southeast and State Street and Mill River on the southwest, while two contractors care for the southeasterly and southwesterly sections. The contracts call for collection in covered metal wagons at three to four day intervals during November, December, January, February, March and April, and on alternate week days during May, June, July, August, September and October. That this periodicity of collection does not obtain is known to all and evidenced by the large number of complaints. During the years 1911-15 there have been on the average about 2800 complaints each year, and during the first eleven months of 1916 there were about 2500. The city imposes a fine of \$5 upon the contractors for each infraction not answered in 24 hours, and this helps in checking laxity of the collectors.

In order to obtain a better idea of the actual efficiency of the service, a house-to-house canvass was conducted by Mr. O'Brien during two periods of a week each, once in June and once in August.

Mr. O'Brien reports as follows:

"Streets were selected at random, generally one from each of the first twelve wards, so as to get a fairly representative idea of conditions throughout the city, and twelve consecutive houses on each street (six on a side) were canvassed for the stated time. Of the streets selected, some were of the poorer class, some of the better class. The condition of the garbage can and the amount of garbage present were noted in each case every day. In this way it was easy to tell whether or not a collection

had been made. If there was any doubt, careful questioning of the householder generally cleared up the situation.

"A study of the records as summarized in the table below indicates that the service is irregular and falls very far short of the three collections a week called for by the contracts. Nor is the collection by the city any better than that carried out by the private contractors.

"A noticeable feature of the present canvass was the dirty and fly-breeding condition of a very large number of garbage cans. In many instances the contents were practically a solid mass of maggots. The fault here seems to be both with the garbage collector for not coming more frequently, and scraping the cans more thoroughly when he does come, and with the householder for not scalding and washing the can after it is emptied. Carelessness and negligence on the part of the collectors were evident from the number of houses 'skipped' upon a street, and from the spilling of garbage in the yard during the transfer from one can to another. The disreputable condition of many of the cans, such as lack of covers, cracks, exposure to flies, etc., is the fault of the tenant or owner of the house. The practice of throwing garbage upon the ash heap and in the yard was due either to the filling of the garbage can and the irregularity of collection, or to the insanitary habits of the householder, or to both. In many instances tenants were obliged to burn or bury their garbage to eliminate nuisance."

GARBAGE COLLECTIONS IN ONE WEEK, SUMMER, 1916

Location	One	Two	Three
†Gregory 90-118		Sat., Tues.	
†Elm, 569-599		Wed., Sat.	
*Oak, 528-504		Sat., Mon. (very irreg.)	
*Cedar, 260-252	Sat.		
*Warren, 26-28		Tues. Thurs.	
*Wallace, 61-92	Tues.		
*Blatchley 162-140	Mon.		
*Blatchley 432-420		Mon., Wed.	
*East, 534-554	Thurs.		
†Humphrey 260-290		Wed., Fri.	
*High, 25-37			Mon., Wed., Sat. (very irreg.)

*Contractor's collection.

†City collection.

Even more serious perhaps is the question of the refuse other than garbage, for the collection of which the city makes no provision at all. Ashes, rubbish and other classes of refuse must be disposed of on the initiative and at the expense of the householder. There are some 50 to 70 collectors who undertake this work without any sort of regulation or supervision. In some districts collections are made with reasonable regularity at a charge of ten cents a barrel. In the poorer sections the refuse accumulates in barrels or makeshift ash bins or in piles in the yards during a period of months and during the spring clean-up is carted away for \$1.50 to \$2 a load. It is, of course, inevitable that much true garbage of an offensive nature is generally mixed in with these accumulations of ashes and rubbish.

Mr. O'Brien inspected the back yards in selected districts and took many photographs like Figs. 10-12. He found the yards in such streets as Elm, Gregory, Humphrey and Blatchley Avenue to be most of them in good condition, but on Oak, Cedar, Warren, Wallace and East Streets many dirty yards were found. Thus of two of these regions he says:

"On Cedar Street, No. —, garbage, papers, cans, etc., thrown in the yard and ash heap, and covered with flies; at No. —, garbage spilled in the yard causing smell; at No. —, garbage spilled about the can and garbage, cans, etc., in the ash heap, with flies very numerous; at No. —, garbage thrown in the ash heap in large amount and drawing flies; the yard, especially the ash heap, very dirty and smelly. The large number of flies in all the yards on this street was remarkable.

"On Warren Street the yard was heaped with garbage, rubbish, etc.; at No. — the yard was dirty, and the people were burning the rubbish; at No. — the yard was dirty and there was garbage about; at Nos. —, — and — the yards were dirty; at No. — the yard was dirty and had garbage in it; and at No. — the yard was dirty, and had a very noticeable number of flies."

We do not feel that the Board of Health is responsible for the existence of these unfortunate conditions. On the contrary we were impressed with the general efficiency of the department in this respect and with the great relative improvement effected by the vigorous clean-up campaign which is conducted by the various departments during the spring months. If there is no systematic public collection of refuse, other than garbage, the accumulation in bins and yards of great masses of filth, particularly during the winter, is inevitable in the poorer quarters of the city.

Dirty back yards are not to-day regarded as of primary importance considered purely from the standpoint of the public health. Except for the problem of fly breeding, which will be discussed in a later section, the

relative values

removal of the conditions described would not appreciably affect the death rate. Civic cleanliness is, however, important for its own sake. Public decency must be considered as well as public health. The dilapidated and overflowing rubbish bins and the untidy back yards of New Haven can scarcely fail to strike an observant visitor, familiar with conditions in other cities. These conditions are not creditable to the city, and as a matter of proper civic pride should not be permitted to continue.

It may be pointed out that "proper disposal of city waste (sewage, garbage, ashes, rubbish, etc.)" is one of the special needs urged upon us by Dr. Wright in a letter of April 18, 1916. We cordially agree; and therefore make:

Recommendation X. That the present system of garbage collection should be improved so as actually to secure in all sections of the city the regular and frequent removals now called for by agreements with contractors; and that a regular public system of collection be instituted for other classes of refuse.

The garbage collected in the city of New Haven is utilized for the feeding of swine, that from the central section at a municipal piggery at the Springside Home and that from the sections served by contractors at farms in Westville and Fair Haven Heights.

Statistics as to the amount of garbage collected are available only for the city's district, in which the yearly collection amounts to 2820 loads of two tons each. The total appropriation for garbage collection is \$26,000, of which the two contractors receive \$5000 and \$6000 apiece. The operating expenses of the piggery amounted in 1915 to \$2505.69 and the profits from the sale of pigs to \$15,589.39, leaving a net profit on garbage disposal of \$13,083.70, enough to pay all but \$2000 of the cost of collection in the municipally served area. Thus the total net cost of collection and disposal, including the sums paid to contractors, amounts to about \$13,000 or less than 9 cents per capita. A near-by Connecticut city of about the size of New Haven pays over \$50,000 for the collection and disposal (by reduction) of its garbage. In general, experience shows that the feeding of garbage to pigs is the most profitable method of disposal for all except very large cities, and New Haven is to be congratulated on the financial success of this procedure in its own case. A part of the low cost may, however, be explained as due to the defective service noted above. Conditions at the piggeries are also not altogether satisfactory and will require the attention of the city authorities in the near future.

The refuse other than garbage, collected by the private collectors, is taken to the city dumps, of which there are fifteen, and to some private dumps. Refuse dumps are objectionable as sources of dust, as starting points for fires, and as breeding places for insects. The problem of a



FIG. XII
THEIR ONLY PLAYGROUND



FIG. XIII
ONE OF THE CITY DUMPS

better system of ultimate disposal must some day be faced. The increasing value of paper may easily make a plant for the utilization of wastes of this character a source of profit to the city. A system of municipal collection must in any case be a preliminary to improved methods of ultimate disposal; and the elimination of the thousands of small dumps which now disfigure the back yards of the city is the condition which requires most immediate attention.

The Fly Problem

Municipal cleanliness and public health are by no means so closely related as was once thought to be the case. There is one way, however, in which filth does have a direct and sometimes a measurable effect upon the death rate,—by furnishing conditions favorable to the breeding of flies, which in turn may act as the agents for the transmission of the germs of communicable disease. Where human excreta are exposed, as in unprotected privy vaults and at such surface sewer outlets as those of New Haven, flies may easily carry the germs of typhoid fever to food, and even in sewered cities, as shown by recent studies in New York, they may play an important part in the causation of summer diarrhea of infants.

The favorite breeding place of the common house fly or filth fly is stable manure, and the proper handling of this substance is fundamental in the anti-fly campaign. In 1916 there were 1338 stables harboring 3431 horses recorded within the city limits; and one of the sanitary inspectors of the Board of Health devotes himself during the summer months to the inspection of these places, and the enforcement of Section 446 of the City Ordinances which provides that "No person shall place, leave, or suffer to remain upon any premises in said city any stable manure (except for fertilizing purposes) or refuse matter in which flies may breed, unless the same is enclosed in a tight box, pit or other receptacle which shall be kept closely covered so as to exclude all flies at all times except when said manure or refuse matter is being placed therein or removed therefrom.

"During the months of May, June, July, August, September, October and November it shall be unlawful for any person to allow said stable manure or refuse matter to remain unremoved for a period of over seven days.

"The penalty for failure to comply with this rule is a fine of *not less than one, nor more than one hundred dollars.*"

The sanitary inspector assigned to the task of the control of fly breeding places made 4356 inspections between March 1 and August 1, 1915, and found 458 stables not in good condition. Four hundred fifty-

five of them made satisfactory changes either upon his order or following admonition from the City Attorney, and three owners were fined.

Interest in the fly problem has been greatly stimulated during the past few years by the activity of the Committee on Sanitation of the Civic Federation under the leadership of Dr. Ferris. In 1914 \$650 was subscribed for this work, five inspectors were employed, and with the co-operation of the Board of Health 1200 stables were catalogued, 8000 inspections made, and 100 stable owners brought into court for violation of the ordinance. A vigorous educational campaign was carried on through the newspapers and by means of pamphlets and placards, lectures and motion pictures. The work was continued in 1915, and in 1916 Mr. G. Russell Phillips, the Fly Inspector of the Federation, personally inspected the stables in the city proper during the summer and left cards bearing the city ordinance above quoted at each place. Mr. Phillips reports as follows in regard to his inspection:

"Most of the stables were in good condition. Many have made arrangements for farmers to come in at least every three days to take away the manure. Others provide for the removal of the manure every day in the week except Sunday. In each instance the farmers were glad to get the manure for taking it away. A few stable owners were discovered who refused to clean up their places at all until they were threatened with the prospect of facing court proceedings. Thirty-five names of people whose premises were breeding flies were handed to the Board of Health and their places were cleaned up with the exception of two or three who were brought into court. In one place a garbage pile was discovered outside the barn that was fairly alive with flies. Upon this pile were a dead cat and several dead rats and about it were half a dozen little children playing. They were handling the dead animals and other refuse in the pile. This was turned over to the Board of Health who took very prompt measures to clean up this nuisance. In most cases where the ordinance was not being lived up to it was a case of carelessness on the part of the owners or occupants themselves, or the servants, and when approached in regard to the matter they were ready and willing to put their places in proper condition."

Conditions were also observed during the past summer by one of us (D. G.) and by Mr. O'Brien, and we too feel that conditions are reasonably satisfactory. For certain periods during July and August Mr. O'Brien studied the relation between sanitary conditions and the extent of the fly nuisance by placing traps in selected localities and measuring the catch at regular intervals. The number of flies caught in clean yards and neighborhoods was usually small. In a number of cases traps showed an almost negligible catch after a week. In fairly clean localities it took

four days to accumulate a pint of flies (900 flies per day). In dirty back yards, on the other hand, with ash heaps strewn with garbage, such as were found on Prince and Wallace Streets and behind a market on State Street, more than two quarts of flies could be collected in three days (4800 flies per day).

It is evident that the control of the fly nuisance will continue to require the earnest attention of the Board of Health; and constant advances in our knowledge of the habits of the insect are likely to make progress more rapid in the future than in the past. It is possible, for example, that less emphasis should be placed on the tight closing of the manure bin and more on the frequent and complete removal of all the manure. The tight, dark bin was designed to prevent the laying of eggs in the manure, but it seems probable that eggs have frequently already been deposited in the manure before it is placed in the bin, and if such be the case the larvæ may easily develop and go into the pupa state unless the manure is absolutely all cleaned out of the bin. Manure bins with impervious floors or so arranged that the floors can be easily and completely cleaned, and stables with water-tight floors (as now required in Washington) are coming to be regarded as specially important factors in the anti-fly campaign.

Mosquitoes and Malaria

The mosquito nuisance is another of the problems of public health and welfare which have been attacked by the Civic Federation with special vigor and success. In the year 1912 the Committee on Sanitation of the Federation organized a Special Committee on Mosquito Extermination, which raised over \$5000 by popular subscription during the first year of its existence. Mr. P. L. Buttrick was engaged as Field Agent, and after a general survey of the local mosquito situation, \$3500 was spent in draining and filling operations of a more or less permanent character, the remainder of the sum being devoted to securing temporary relief by oiling.

There are three main factors in the New Haven mosquito problem: the salt marshes which breed the salt marsh mosquito, *Culex sollicitans*; the fresh water marshes and sluggish streams which breed the *Anopheles* mosquitoes; and fresh water pools, barrels, tin cans, catch basins, roof gutters and other small accumulations of stagnant water in which the rain barrel mosquito, *Culex pipiens*, thrives. As pointed out by Mr. Buttrick (Report on Mosquito Control, Documents of the Civic Federation of New Haven, No. 10, March, 1913), there are several hundred acres of salt marsh in the immediate vicinity of New Haven, a large portion of the area offering suitable breeding grounds for mosquitoes. The Cove marsh and Sandy and Old Field Creek marshes in West Haven, the area

bordering West River between Congress Avenue and the New York, New Haven & Hartford Railroad tracks to the west of New Haven, the section along Mill River in the center of the city, the Quinnipiac meadows to the east, and the Fort Hale, Morris Cove and South End marshes in East Haven are the principal areas of this sort. The most important fresh water marsh areas (of special significance as breeders of the *Anopheles* or malarial mosquito) in 1912 were Old Field Creek marsh above Blohm Street in West Haven, the section bordering West River above Congress Avenue, Beaver Swamp to the northwest, and isolated spots near Lake Whitney and on the watersheds of the Quinnipiac and Farm Rivers and of the brook which flows through East Haven east of Burr and Concord Streets. Drainage operations for the control of mosquito breeding were first begun in 1912 on the Morris Cove meadows, where 191 acres were drained, and 86 acres of the South End marsh, 81 acres in the lower West River Valley and 17 acres near Fort Hale were also treated.

In 1915 an Act Providing for the Elimination of Mosquito Breeding Places or Areas was passed (Chapter 264, Public Acts of 1915), giving power to the director of the Connecticut Agricultural Experiment Station to make rules and orders concerning the elimination of mosquitoes and mosquito breeding places or areas, to ascertain where mosquitoes are breeding, and to survey, drain, fill or otherwise eliminate any mosquito breeding place. Subject to appeal to the courts by aggrieved parties, it was provided that the director shall drain, fill, or otherwise treat such areas, whenever funds have been provided for the purpose by the state or any city, borough or town, or by private contributions; but no appropriation was made by the Legislature for carrying out the purposes of the act. It was further provided that the city, town or borough in which such improvements are made shall keep drains unobstructed and maintain suitable tide gates for keeping them in operation.

Four acres of marsh east of West River, near its mouth, were drained at the expense of the railroad in 1915, and about 90 acres on the west shore of West River between Spring Street and Congress Avenue were drained by private subscription in 1916. The Board of Finance has included in the 1917 budget an appropriation of \$10,000 which it is believed will clear up some of the worst of the serious mosquito breeding areas which remain within the city limits (Fort Hale marshes, the shores of the lower Quinnipiac, areas still undrained in the West River Valley and Beaver Swamp).

The Anti-Mosquito Committee, Inc., has kept an inspector in the field each summer to locate mosquito breeding places and keep existing drainage ditches in good condition.

In general, progress in the solution of the mosquito problem of New

Haven may be considered most satisfactory and the completion of the drainage system planned for the coming year should bring substantial relief. In such projects, however, it is important that the diminution of the general mosquito nuisance to be obtained by the drainage of extensive salt marsh areas should not receive exclusive attention at the expense of the less obvious but more important problem of controlling fresh water areas which breed the malarial mosquito. Some of the worst places of this kind in Beaver Swamp and along West River have been eliminated and the Park Commission and the Civic Federation have done a considerable amount of oiling during the past few summers. Yet the *Anopheles* mosquitoes are far too abundant in New Haven and the malaria which results is a serious factor in the sickness rate of the city.

Eleven physicians interviewed by us have courteously furnished us with records of 85 cases of malaria seen by them during 1916 and the location of these cases is plotted in Fig. 14. It will be noted that these data, which are of course very incomplete (twenty other physicians interviewed had all seen many cases but had no detailed records), indicate distinct centers of infection in the neighborhood of West River, Beaver Swamp, Mill River (near East Rock Park) and in Fair Haven.

This is a problem which we believe deserves the very earnest attention of the city authorities. The salt marsh mosquito is a nuisance, but the malarial mosquito is a serious menace to health, and the opposition of private property owners (which as we are informed has delayed the clearing up of Beaver Swamp) should not be permitted to stand in the way of a vigorous campaign against this insect. We cannot believe that the courts would sustain any appeal against Chapter 264 of the Acts of 1915 when a direct health menace was involved. We therefore urge as

Recommendation XI. That in the drainage operations planned for 1917 the fresh water areas which are likely to breed malarial mosquitoes (such as those in Beaver Swamp, on the shores of West River and of Lake Whitney, and in East Haven) should receive first attention.

It must be remembered that the control of the malarial mosquito requires not only the drainage of extensive swampy breeding areas, but a constant surveillance to detect small isolated breeding places. *Anopheles maculipennis* is commonly found in sluggishly running streams and is comparatively easy to control, but *A. punctipennis*, which recent studies have shown is also a carrier of malaria, may thrive in all sorts of small accumulations of standing water. The suppression of these insects is an important part of the public health campaign and should be systematically undertaken by the Board of Health. The Board now has a regulation prohibiting the exposure of "any can, kettle, pail, barrel or other receptacle containing rain or stagnant water; unless the same is effectively

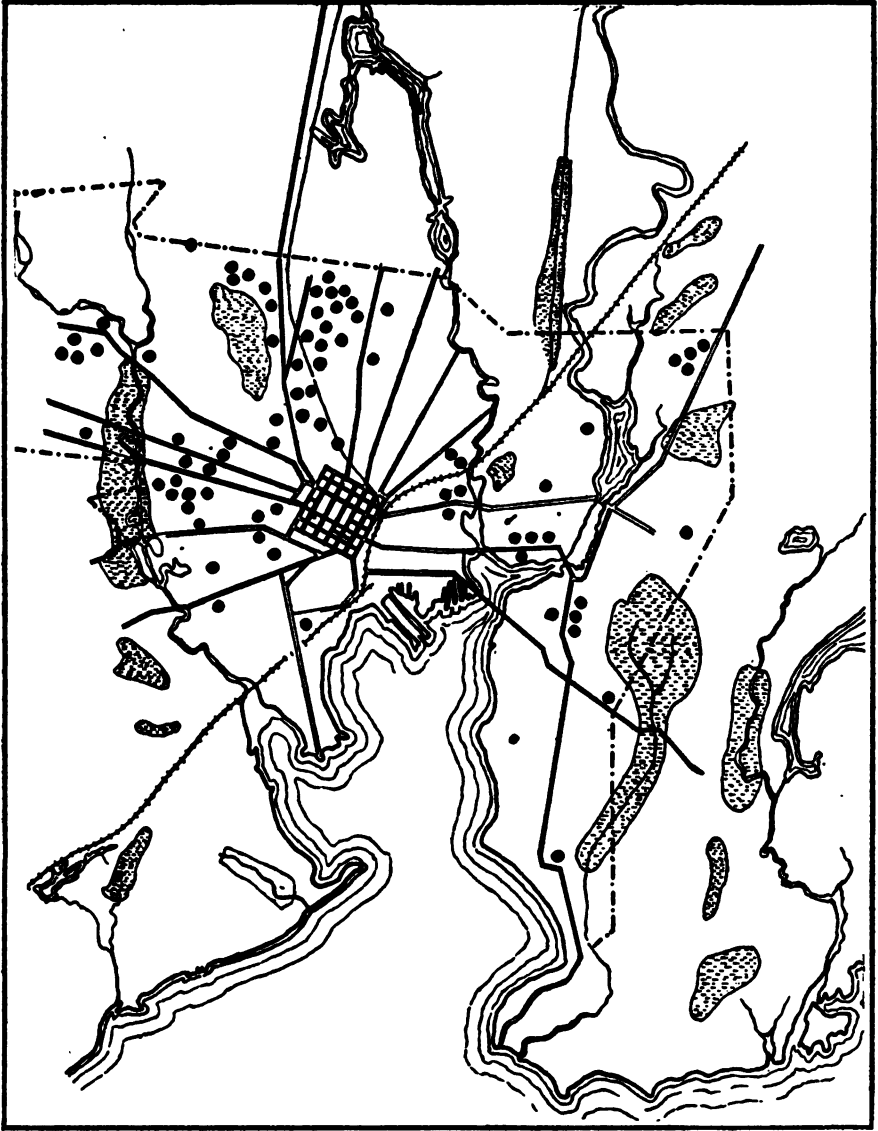


FIG. XIV

MOSQUITOES AND MALARIA

The shaded areas indicate the principal malarial-mosquito-breeding marshlands of New Haven. Each dot represents the location of a case of malaria of which we have record during 1916.

screened against mosquitoes." One of the sanitary inspectors of the Health Department devotes a part of his time during the summer months to the enforcement of this regulation. In the latter part of the summer of 1915 he made 300 inspections of vacant lots and found 53 that contained receptacles or pools of stagnant water. All but three were cleaned up on his request, and the others under threat of prosecution by the City Attorney.

The regulation cited above should be broadened so as to cover other mosquito breeding accumulations of water not in "receptacles." Furthermore we believe that a definite attempt should be made to gain a complete knowledge of the prevalence of malaria in New Haven and of its relation to *Anopheles* breeding places.

Recommendation XII. That the Board of Health modify its regulation in regard to mosquito breeding receptacles so as to declare any accumulation of stagnant water in which mosquitoes breed to be a public nuisance.

Recommendation XIII. That the Board of Health adopt a regulation declaring malaria to be a notifiable disease and that provision be made for investigating each case as reported in order to determine the existence of local foci of infection.

C. HEALTH ORGANIZATION OF THE CITY

General Form of City Government

The city of New Haven is governed under a charter which provides for the election every alternate year of a Mayor, Controller, Treasurer, Clerk, Collector, City Sheriff, and six Aldermen at large and of fifteen Aldermen representing the individual wards. The Corporation Counsel, Police Commissioners, Fire Commissioners and Chief, Director of Public Works, Park Commissioners, members of the Board of Health, Board of Education, and Board of Charities and Correction, and certain other executive officers are appointed by the Mayor. The municipal budget is framed and all bills against the city approved by a Board of Finance composed of the Mayor, the Controller, one Alderman, elected by the Board of Aldermen, and six citizens appointed by the Mayor.

The city includes fifteen wards, three of which, Wards 13, 14 and 15, retain a certain degree of independent self-government. In these wards the Westville school district, the South school district and the Borough of Fair Haven East remain intact as before the consolidation of 1897, and public service in these wards and assessments and taxation for city improvements are limited by the status existing before that date. So far as public health matters are concerned all the fifteen wards are for practical purposes under the jurisdiction of the central municipal authority.

The Board of Health, Its Duties and Powers

The Board of Health, which exercises "care and control" over the Department of Health, is composed of five members, two of whom must be physicians. The members of the Board serve without pay. One member is appointed annually to serve for a term of five years and the Board chooses its own president.

The Board has "all the jurisdiction, power, privileges and duties now by law vested in and imposed upon the town health officers in this state in their respective towns." Since Section 2521, Chapter 151, of the General Statutes, provides that the town health officer "shall have and exercise all the powers necessary and proper for preserving the public health and preventing the spread of diseases," the authority granted would seem to be an extensive one.

Further powers in regard to the inspection and regulation of the sale

of foodstuffs, the licensing of milk vendors and the abatement of nuisances are specifically granted. Most important of all it is provided that:

"Said board may, from time to time, make such by-laws, rules, regulations and orders as in its judgment the preservation of the public health shall require, to be enforced in the same manner as city ordinances, which by-laws, rules, regulations, and orders shall be of full force and effect throughout the entire fifteen wards of said city; *provided* the same be not inconsistent with the constitution or laws of this state or of the United States or with the charter or ordinances of said city; *and provided* that said board shall in no case impose a penalty of more than one hundred dollars for a single violation of any by-law and that no suit or process shall be brought for such violation unless said by-laws have been published at least four times in some daily newspaper printed in said city, before such violation occurred." (Section 94 of An Act Revising the Charter of the City of New Haven, as amended by act approved May 29, 1901.)

The most important function of the Board of Health, to which we shall return in the succeeding section, is this function of formulating regulations; for the wise exercise of such a quasi-legislative power can best be secured by the joint action of a board or council. In the direction of broad policies and perhaps also in the decision of specially important problems involving sharp conflict of interests the action of the Board of Health may be required. Experience in municipal government, in this and other fields, has made it amply clear, however, that ordinary details of administration, and particularly the appointment of subordinates and the assignment of their duties, should be concentrated in the hands of a single responsible executive. It seems to us unfortunate therefore that Section 25 of the Charter Act provides that all employees of the Department of Health shall be appointed and their respective powers and duties determined by the Board of Health. The high character of the Board as it has generally been constituted and the tact and judgment of the Health Officer, Dr. Wright, have on the whole secured good results from the present system. The principle, however, is a bad one and the appointment of inspectors, clerks, nurses and the like by a board of five members rather than by the Health Officer,—still more the apportionment of their individual duties,—tends to interject politics into a department and to militate against its administrative efficiency. We therefore urge as

Recommendation XIV. That Section 95 of the Charter Act be amended so as to provide that the Board of Health shall appoint the Health Officer and determine the general policies of the department, while the conduct of administrative details shall be entrusted to the Health Officer, and all appointments of other employees shall be made by him under the rules of the Civil Service Board.

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Precedents for this policy may be found in the method of appointment now in force in the Department of Education and the Department of Public Works.

The Sanitary Code

One of the most fundamental principles of effective public health work is the principle that the Sanitary Code, for city or state, should be formulated, not by a general legislative body, but by a small expert board or council.

Sanitary regulations in order to be at the same time reasonable and effective must go into a detail far beyond the possibilities of ordinary legislation and should be modified to meet changing conditions in a way which cannot be secured by the action of large legislative bodies. The delegation of quasi-legislative powers of course requires confidence in the body to whom they are entrusted, but experience has shown that in this way and in this way alone can adequate health protection be assured.

The City Charter as noted above does actually confer upon the Board of Health the power to make regulations not inconsistent with ordinances of the Board of Aldermen. In practice, however, many of the more important matters have been referred to the Aldermen to be embodied in ordinances, often without result; while in some cases regulations made by the Board have been rendered null and void by conflicting ordinances enacted for the purpose. Dr. C. J. Bartlett, President of the Board of Health, alluded to this matter as follows in the Annual Report of the Health Department for 1915:

"The most serious external condition that confronts the department, in my opinion, is its inability to secure adequate local health regulations. As examples of this I need only to mention the vain attempts of this board in previous years to secure a much-needed amendment to our milk ordinance, or to remind you of the fate of the health regulation regarding the taking of clams and oysters for direct consumption from our grossly polluted harbor, which regulation was entirely nullified by an ordinance later passed by the then Board of Aldermen. If New Haven hopes for the best health conditions, it must be willing to adopt approved methods of securing these. Its Board of Health must be given a free hand in making adequate regulations in its own field of work. This broad view of granting necessary powers to a board of health in order to make it efficient has been adopted both in New York City and New York State upon the basis that prevention of disease and death, in so far as possible, is of prime importance to the welfare of the city and the state."

The city of New Haven has at present no complete and effective sanitary code. Sections 382 to 397 of the ordinances of the city provided for

the reporting and isolation and exclusion from school of certain communicable diseases and prohibited the distribution of samples of medicines; and a new and more comprehensive ordinance on the reporting and isolation of communicable diseases has recently been passed. Board of Health regulations provide for the sanitary handling of foods, prohibit spitting and regulate lodging houses, the keeping of poultry and the maintenance of mosquito breeding receptacles. There are no provisions whatever in regard to the control of milk supply or of the quality of foods, except for protection in handling from dust and flies. There is no machinery provided for dealing with tuberculosis. There are no specific regulations in regard to nuisances (other than those dealing with spitting and the care of manure). There are no regulations in regard to the sanitation of theaters and other public buildings, of schools, factories or public conveyances.

Recommendation XV. That the Board of Health prepare and adopt a comprehensive and up-to-date Sanitary Code; and that the Health Committee of the Civic Federation urge upon the Board of Aldermen the propriety of permitting to the Board the free exercise of this power within the legitimate field of public health, unhampered by aldermanic ordinances.

It will be noted that instead of the present plan under which the Aldermen and the Board of Health divide the task of code-making, and the Board of Health and the Health Officer divide the work of administration, we are suggesting that the formulation of the Sanitary Code be left to the small and expert Board of Health and the executive work of the department be entrusted to a single responsible head, the Health Officer,—a policy in accord not only with the best health department practice but with all modern tendencies in municipal government. We believe that the delegation of the code-making power to the Board of Health may be left to the discretion of the Board of Aldermen without alteration of the organic law. If, however, the Board of Aldermen should prove unwilling to leave this power in the hands of the body best qualified to exercise it a change in the charter would seem essential.

Organization of the Department

The present staff of the Department of Health includes the following officers:

Health Officer, Frank W. Wright, M.D.

Clerk, Ward Bailey.

Bacteriologist, Dwight M. Lewis, M.D.

Farm Inspector.

Milk Inspector.

Two Food Inspectors.
Five Sanitary Inspectors.
Tenement House Inspector.
Three Medical Inspectors of Schools.
Dentist and Assistant.
Seven School Nurses.
Stenographer.
Technician.

An additional inspector will be provided this year (1917).

The internal organization of the department is of the simplest, all of the employees being directly responsible to the Health Officer and all except the bacteriologist, who enjoys a considerable measure of independence, keeping in constant touch with him in regard to all details of their work. The inspectors report to Dr. Wright each morning and receive orders from him, while the school physicians and school nurses meet him for a conference once a week. Mr. Bailey, though he bears only the title of clerk, is in effect the secretary of the department, attending to routine correspondence and being in charge of the office in the absence of the Health Officer.

Such a system as this is admirable in a small office, but for the health department of a city of 150,000 there would be many advantages in a somewhat better developed plan of organization. With the extensions of the work which seem urgently called for in the future such a plan will be essential.

A better system of record keeping would materially contribute to efficiency. Complaints for instance are at present simply entered in a "blotter." The individual inspector keeps record of his assignments in an ordinary notebook. Mr. Bailey was sent out by the Board of Health last year to examine systems of office administration in use by the health departments of nine large cities, and in regard to this matter he made the following recommendations:

"I believe the sanitary records should be made as concise, simple and complete as possible. I would record all complaints either in an office record book or better, I think, on the Buffalo stub system. I would have all complaints, whether received at the office or outside, plainly numbered and all orders, notices or reinspections afterwards to bear the same number. I would have a record card filled out by the Inspector on the premises. I would have a stub system of orders issued by the Inspector, whenever possible, upon the premises. I would have all orders, reinspections, notices of any kind, extensions and prosecution endorsed fully upon the record card. I would file the record card with copies of all

notices, orders or correspondence in a filing envelope, the Buffalo plan, the outside of the envelope plainly showing the number, the situation of the nuisance, the party served upon, the date of order or notices or re-inspections, the date and result of prosecution. This envelope gives the entire history of the case with every fact necessary for prosecution. I would index this envelope by street and number and file the same by date of the expiration of the orders given; if the time is extended change the filing date. This system presents daily in the office all the pending business which as a rule should be first attended to. No excuse can then be given for delays or overlooking work. I would have a daily time report of the Inspector showing when and what work he had done the previous day. From this report all pending business can be checked and the Inspector's attention called to any oversight. I would have this system apply as far as practicable to all our Inspectors."

These excellent recommendations were approved and blank forms actually prepared for carrying them into effect; but after a half-hearted trial of a few days the department went back to the old methods.

The inspectors make daily and monthly reports to Dr. Wright of the number of inspections made, but as to thoroughness of work and economy in the use of time they are practically without supervision. In the case of the school nurses, as we shall point out later on, the effects of lack of supervision are serious, and similar results must in some measure be felt all through the department. It is impossible for the Health Officer to keep his hand on twenty-five employees doing such different classes of specialized work as are involved in a modern health department and at the same time to devote the requisite energy to the development of broad lines of policy. In order to improve the details of office administration in the interest of efficiency and economy and at the same time to free the Health Officer for the development of broad policies along the newer lines of public health, we believe that something in the nature of bureau organization should be introduced. The ten milk, food and sanitary inspectors (except the inspector employed on communicable disease work) form one natural unit which might properly be directed by a single head. The school nurses and such other nurses as may be employed by the department (except those who may deal specifically with communicable diseases) form another; while the control of communicable disease and the work of the laboratory constitute two other natural divisions of health department work. We shall make specific recommendations in regard to these points as the several topics are taken up later on.

We cannot, however, leave this general subject of administration without an expression of warm appreciation for what Dr. Wright has

accomplished with the machinery at his disposal. Both methods and morale are important, but morale is by far the more essential of the two; and this the New Haven Health Department has. So far as we have seen the whole force is animated by a spirit of loyalty and devotion to the work of the department that constitutes a rare tribute to the character and the personality of its chief executive.

One matter which should receive serious consideration is the limited office space allotted to the department. The bacteriological laboratory is in a small attic room in the police court building. The Health Officer and eleven employees are crowded into a single room in the City Hall. Adequate provision for the department was to have been made in connection with the remodeling of the old Court House building; but complications appear to have arisen which threaten to interfere with this plan. Some relief is urgently needed. We therefore make

Recommendation XVI. That the need for adequate quarters for the Department of Health be vigorously urged upon the proper city authorities.

Inspection of Nuisances

Of the five sanitary inspectors on the staff of the department one is assigned to the work of placarding and disinfecting in cases of communicable disease, under the direction of Dr. Lewis. A second devotes himself during the summer to the task of fly and mosquito control, and during the winter to the inspection of barber shops. The other three conduct the regular sanitary inspection each in a particular district, one of the three also having charge of the inspection of theaters.

The three district inspectors attend to all complaints and also carry on a systematic house-to-house inspection so far as time permits. Their daily reports show the places at which complaints are investigated, the streets visited and the orders and notices served, the latter being also recorded on a stub system. Monthly reports are presented in somewhat greater detail, the summary of the monthly reports for the year 1915 being given in the last annual report as follows:

WORK OF THREE DISTRICT SANITARY INSPECTORS, 1915

Inspections	18,965
Nuisances found	3,100
Nuisances abated	2,907
Complaints received	897
Complaints justifiable	678
Cases of unsanitary plumbing corrected	115
Water closets made sanitary	169
Privy vaults abolished	104
New toilets installed	129

So far as these records go and so far as we have been able to ascertain from other sources, the work of the sanitary inspectors seems to be generally efficient and satisfactory. We feel quite certain, however, that the keeping of records on a proper card and envelope system (such as was suggested by Mr. Bailey) would in the end facilitate their work and, since the envelopes could be arranged by date while "active" and afterward by streets, they would provide an invaluable index to past and present sanitary conditions.

The special inspector assigned to fly and mosquito control and inspection of barber shops reports the inspection of 4356 barns, 407 barber shops, and 2335 tenement houses (1357 of the latter inspections at night).

In considering the proper place of nuisance inspection in the work of the Health Department it is important to keep in mind the distinction between conditions which are merely offensive to sight and smell and those which contribute directly to the spread of disease. Miscellaneous rubbish in back yards is an example of the former class, exposed privies and fly-breeding manure piles of the latter. We believe that privies, stables and mosquito-breeding pools deserve considerably more attention than they are now receiving in New Haven; and it is the belief of the Health Department that the Housing Inspector requires assistance in his special field.

In his letter to us under date of April 18, 1916, Dr. Wright has pointed out the proper way to make sure that the vital health-protective work of the department shall be fully carried out,—by freeing its inspectors of the work of attending to the ordinary nuisances which have no definite sanitary bearing. He suggests that "The inspection and responsibility for conditions of yards, vacant lots, dumps, etc., be placed upon the police department, the present corps of sanitary inspectors to confine their efforts to inside conditions and matters that affect them, or are affected by them."

With this suggestion we are in hearty accord; and we therefore make *Recommendation XVII. That the Board of Aldermen take such action as may be necessary to place responsibility for the inspection and control of ordinary nuisances, such as are due to accumulation of rubbish in vacant lots, yards and the like and the investigation of complaints relating thereto, in the hands of the police department, so that the inspectors of the Health Department may devote their attention to the problems of fly and mosquito control, the protection of privy vaults, the improvement of housing conditions, and other matters bearing more directly upon health.*

We feel, as pointed out above, that the work of the inspection force would gain from a better system of record keeping and a closer adminis-

trative supervision. It seems to us that the food and milk inspectors as well as the tenement house inspector might be included for this purpose under a single head. It would be only a fitting recognition of good service to appoint this new official from the ranks of the present staff; and he should of course be selected for merit by a civil service examination in which experience and the personal factor as displayed in an oral test receive due weight.

We therefore urge as

Recommendation XVIII. That the Farm Inspector, the Milk Inspector, the two Food Inspectors, the four Sanitary Inspectors (excluding the one assigned to communicable disease work) and the Tenement House Inspector be organized as a Bureau of Inspection, with a Chief or Supervising Inspector at a salary of \$2000, to be chosen by competitive examination from the ranks of the present staff.

One obstacle which has interfered with a maximum of efficiency in the work of the Health Department has been the difficulty in securing prompt and effective backing from the courts. The Health Department wisely relies on educational methods wherever possible, but with the occasional stubborn offender vigorous legal pressure must be applied.

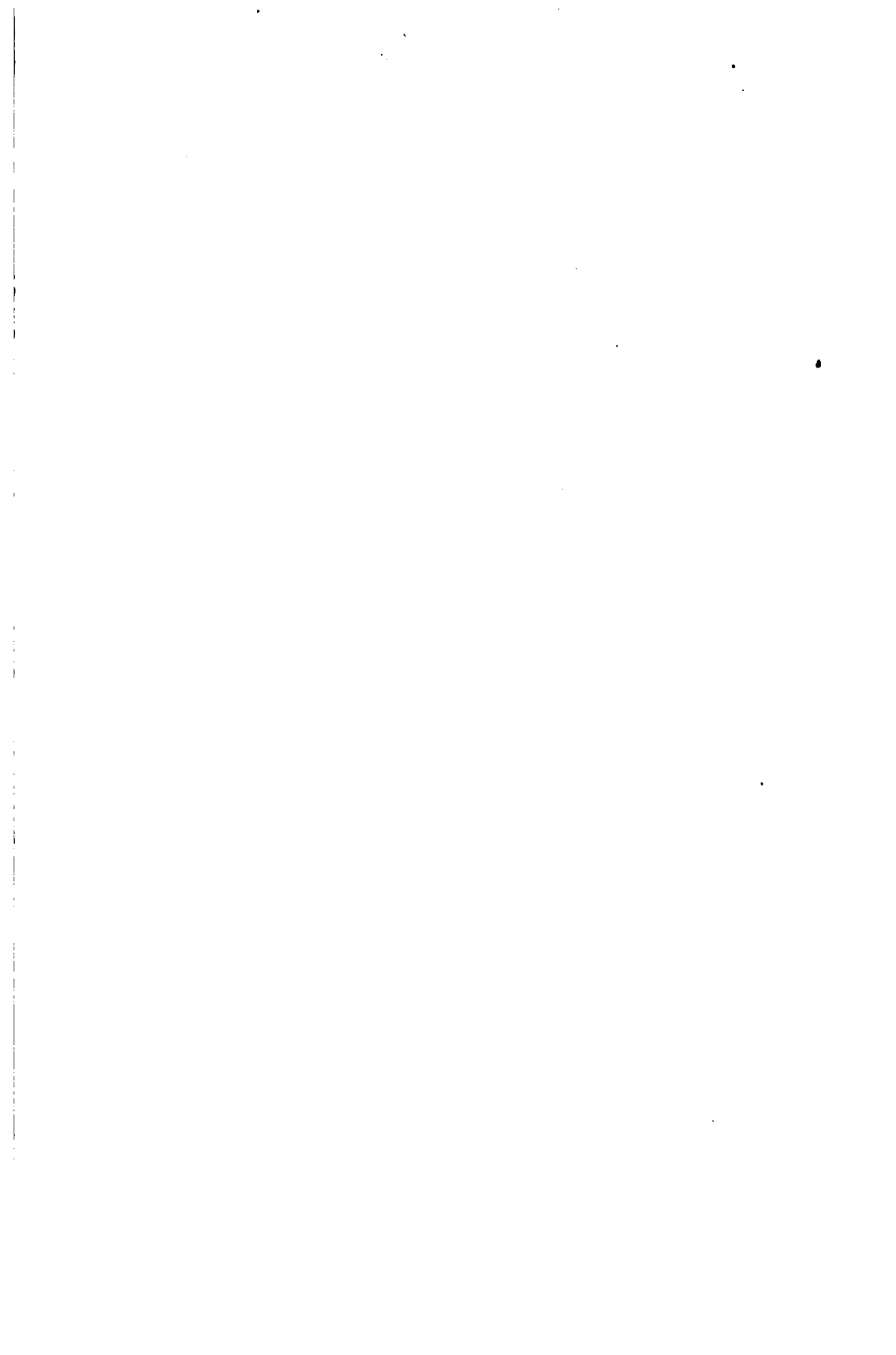
The City Attorney has for many years had but one assistant, while the business handled has increased more than threefold. The collection of personal taxes alone has added tremendously to the burden of work in his office. We believe for the good of other city bureaus, as well as for the sake of the Health Department, that this condition should be remedied; and suggest as

Recommendation XIX. That the Civic Federation through some appropriate committee consider the question of the adequacy of the staff of the City Attorney's office to the present needs of the city, and the advisability of taking steps to secure the appointment of an additional assistant in that office.

Supervision of Food Supplies

The supervision of food supplies (other than milk, which will be separately considered) is in the hands of Food Inspector J. J. O'Gorman and Assistant Food Inspector H. J. Frederick. Mr. O'Gorman inspects restaurants, bakeries, macaroni factories and candy kitchens, and Mr. Frederick, meat markets and stores. During 1915, 7283 inspections were made of markets and stores, 2570 of restaurants, 1878 of bakeries, and 417 of candy kitchens.

Dr. Wright has attempted to secure the passage of an ordinance requiring the licensing of all places where foods are sold, but the courts have



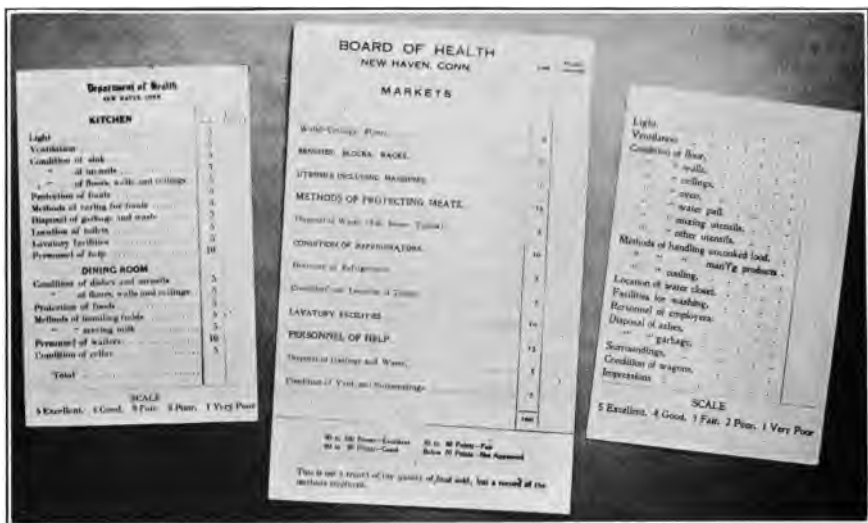


FIG. XV

Samples of Score Cards used in the Food Inspection Work of the Department of Health

apparently decided that, so far as restaurants are concerned, this cannot be done. The department has, however, accomplished excellent results by a campaign of education supplemented by specific legal proceedings when necessary. Each type of establishment has a special score card on which the results of the inspection are recorded. These score cards are of Dr. Wright's own devising and seem to us simple and satisfactory. The results of the scoring are published once a year in the monthly bulletin of the department. The bulletin for April, 1916, for instance, contained the current and previous scores of 79 bakeries and the bulletin for January, 1917, the scores of 89 lunchrooms. Succeeding scores show a marked and progressive improvement as a result of the stimulating effect of these publicity methods. For instance, on the first visit only 13 restaurants scored 90 or above and 27 were below 70, while on a second visit 31 were 90 or above and only 17 below 70. Mr. O'Gorman reports that \$50,000 was spent by owners or operators in the improvement of bakeries in 1915 as a result of the campaign.

A number of typical food stores, bakeries and restaurants have been inspected by two of us (C.-E. A. W. and D. G.), alone and in company with the department inspectors. We have been impressed with the high standards of cleanliness which generally prevail and believe that New Haven may feel well satisfied with the results attained.

In one respect, however, and that the most important one of all, the food supply of New Haven is entirely unprotected. Diseased human beings constitute a far more serious danger to foods than uncleanly surroundings; and progressive health departments are now providing for the systematic medical examination of food handlers to guard against such infection of foods as has caused serious epidemics in the past. The past high typhoid rate in New Haven makes such a precaution seem particularly desirable. Dr. Wright has urged that measures should be taken to provide this important safeguard, and we are wholly in accord with him.

Recommendation XX. That provision should be made in the Sanitary Code for requiring the medical examination of food handlers along the general lines of the New York City Ordinance upon this subject.

There is one other food-supply problem which requires attention,—the control of the sale of meat from diseased animals. Over 90 per cent of the meat products consumed in New Haven are shipped in interstate commerce and are therefore subject to Federal inspection. The rest of the supply, of local origin, comes in the main from slaughterhouses in West Haven. These animals are inspected at the time of killing by Jewish rabbis (koshermen) and only meat which reaches their high standards can be sold to Orthodox Jews. The carcasses rejected by the

koshermen, however, are habitually sent to New Haven and sold in the poorer stores to the non-Jewish population. The Health Officer of West Haven has proved generally coöperative and permits Mr. Frederick to visit the West Haven slaughterhouse, but the New Haven officials have no power there and the effective control of the situation is impossible under present conditions. On an inspection made by one of us (C.-E. A. W.), a carcass was seen hung up ready for the market which bore the mark indicating rejection by the kosherman and still showed distinct evidences of advanced tuberculosis in spite of the effort that had evidently been made to cut away all the parts which are most commonly diseased.

Dr. Wright urges the "establishment of a municipal slaughterhouse and the passage of ordinances that require all meats to be either federally or locally inspected." Mr. Frederick (who is not a veterinarian but has a good practical knowledge of meat inspection) does what can be done in the way of detecting diseased meat in the stores, and during 1915 condemned 5164 pounds of meat and 144 pounds of poultry. Effective control, however, absolutely requires ante mortem and post mortem inspection at the time of slaughter, and this can only be secured in a slaughterhouse within the city limits and under the control of the Health Department. Bridgeport has a municipal slaughterhouse and an excellent ordinance covering the whole subject. Such a slaughterhouse need not be costly to construct and its operation would be covered by the fees charged for slaughtering. The danger to health from diseased meat is not quantitatively as serious as is often thought to be the case, but it is a sufficiently real one to deserve attention.

Recommendation XXI. That steps should be taken to provide a municipal slaughterhouse within the city limits and that regulations be included in the Sanitary Code prohibiting the sale of meat which has not been passed at the time of slaughter by either Federal inspectors or those of the local department of health.

Supervision of Milk Supply

Of all food products milk is the one that is most likely to be a factor in the spread of communicable disease. It may carry the germs of tuberculosis from the cow to man. It very frequently becomes infected from human cases of disease or carriers; and even when not specifically infected the ordinary dirt germs which it contains play an important part in causing digestive summer diseases of children. The proper safeguarding of the milk supply is therefore one of the primary essentials of sanitation.

The first step in controlling the condition of the milk supply is inspection of farms, dairies and food stores to see that this very perishable

foodstuff is produced and handled under reasonably cleanly conditions. This phase of the work is provided for in New Haven by the employment of two inspectors, one of whom inspects the farms, while the other inspects the dairies and visits the food stores to see that they comply with the Board of Health regulation which requires such stores to take out a license for the sale of milk. In 1915, 1543 inspections were made of 763 farms shipping milk to New Haven, 4152 inspections of the dairies of 125 dealers handling this milk, and 2526 visits to 774 stores selling it. The results of the farm and dairy inspections are recorded on score cards of a type devised by the New Haven Department of Health, which are very similar to the cards used for store and restaurant inspection, specifying only a few broad points and permitting a wide latitude of opinion to the Inspector. Such a type of card seems quite adequate for store inspection, but in the case of farms and dairies elaborate score cards have been devised and more or less standardized by various health departments and by the United States Department of Agriculture which seem to us much more satisfactory. They go into such detail that the inspector has merely to record the presence or absence of certain specified conditions, while in filling out the New Haven card he assigns from 5 to 10 points to a single item merely according to his general subjective impressions. The dairy score cards in use elsewhere are, however, at this time in process of modification as a result of studies of the relative value of various factors in milk production. Perhaps it will be as well to wait for the outcome of these revisions before making a change; but the present New Haven cards do not seem to us to be adequate ones. ?

Farms failing to score 70 points on the scale of 100 used are not permitted to ship milk to New Haven; and the results of the dairy scoring are published at intervals in the monthly bulletin of the department. The sale of dipped milk is prohibited and practically all the milk sold in the city is delivered in bottles, a condition which is highly gratifying.

The dairy inspector takes four samples of milk each month from each of the hundred-odd dealers, 5033 samples in all being taken in 1915. These samples are examined in the laboratory for butter fat and total solids (to detect milk that has been watered or is otherwise of deficient food value). Smears are also made and examined under the microscope to discover streptococci or pus cells from cows with diseased udders. No direct physical test is made for dirt, nor is any bacteriological count attempted. Dr. Lewis, the bacteriologist of the department, believes that he can recognize certain spore-forming bacteria on the smears which he considers indicative of pollution, but this is a test which so far as we are aware does not rest on any basis of generally demonstrated fact.

Since the bacteriological count is accepted by sanitarians with practical

Yet they have farm inspection

unanimity as the best test of the general sanitary quality of milk we had a series of 200 samples collected and examined in this way by Mr. D. O'Brien in order to gain an idea of the general condition of the New Haven supply. The samples were collected during July and August so that they represent the worst conditions of the year so far as temperature is concerned. The milk was obtained by purchase either from wagons or from stores in various districts and it is believed represents a fair average sample of the supply of the city at that season. Plates were made promptly after the collection of the samples and incubated under standard conditions on lactose agar for 48 hours at 37° C.

The general distribution of the results obtained is indicated in the table below and in Fig. 16. We have classified the counts obtained in four groups, under 100,000 bacteria per c.c., 100,000 to 1,000,000, 1,000,000 to 5,000,000 and over 5,000,000. One hundred thousand bacteria per c.c. is the maximum number of bacteria permitted, according to generally accepted standards, in milk to be drunk raw, while 1,000,000 is the maximum number generally allowed for milk to be used for cooking. The milk samples are arranged below in three groups, including the raw milk, the bulk pasteurized milk, and the milk pasteurized in the bottle.

BACTERIAL CONDITION OF NEW HAVEN MILK, JULY AND AUGUST, 1916

	Number of samples showing indicated numbers of bacteria per c. c.			
	Under 100,000	100,000 to 1,000,000	1,000,000 to 5,000,000	Over 5,000,000
Raw milk	7	37	58	57
Bulk pasteurized milk	3	4	2	2
Bottle pasteurized milk	11	13	4	2

With all due allowances for the season of the year these results are nothing less than astounding. Of the raw milk samples 115 out of 159 or 72 per cent showed over a million bacteria per c.c., which according to the rules of the Commission on Milk Standards would make it unsalable until pasteurized, its use even after pasteurization being only permitted for cooking. The law of the state (Chapter 221, Section 18, Public Statutes of 1911) says that "milk containing more than one million bacteria per cubic centimeter shall be considered impure milk."

The highest count obtained was 1,028,000,000, which must be nearly a record; but counts of twenty to thirty million were not uncommon. A few specific cases of particularly poor supplies are noted below.

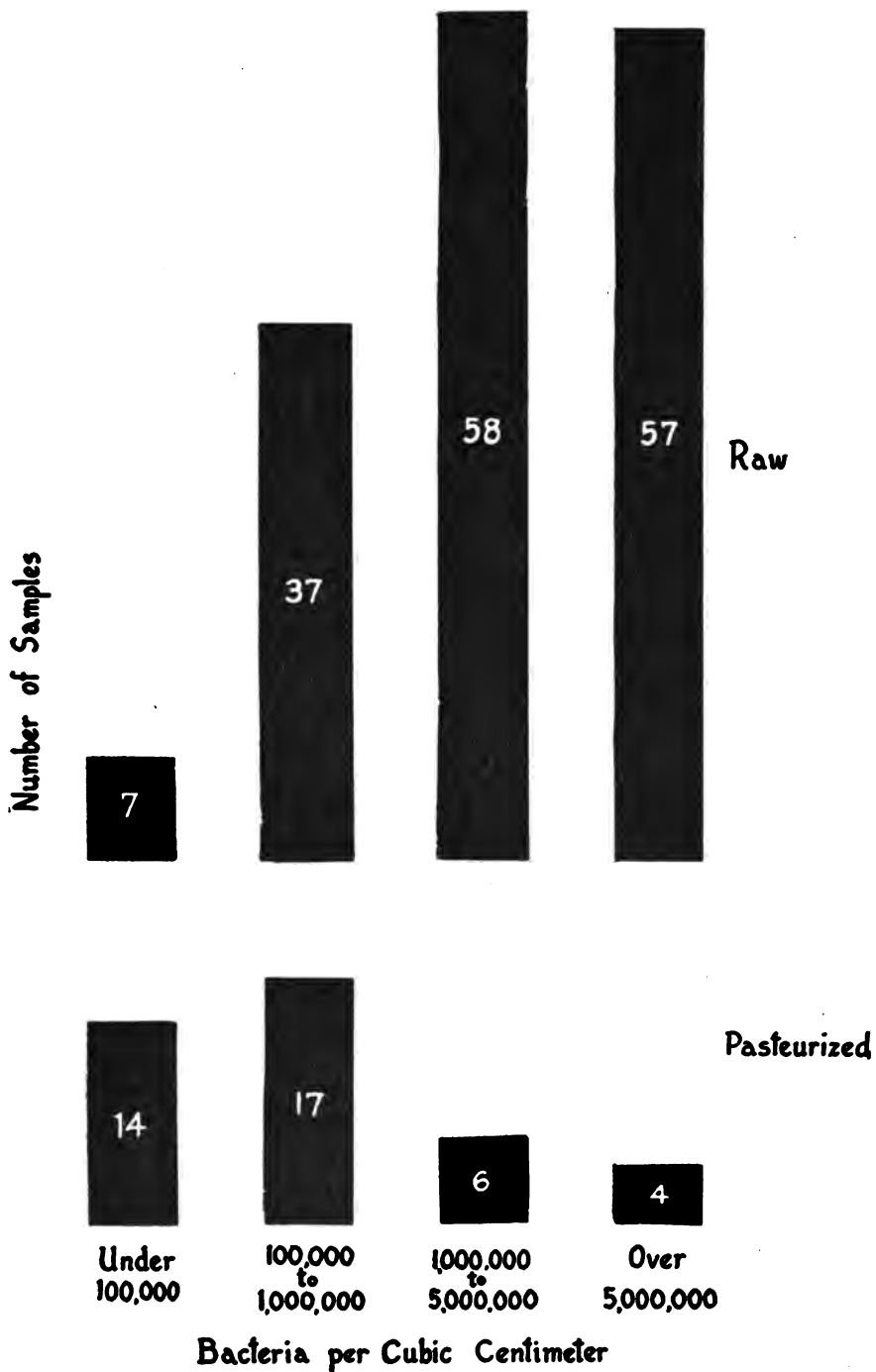


FIG. XVI

Diagram illustrating the distribution of 200 samples of New Haven milk according to Bacterial Content. Samples of Raw Milk above, samples of Pasteurized Milk below.

BACTERIAL COUNTS OF PARTICULARLY POOR SUPPLIES

Dealer	Number of samples showing bacteria per c. c.			
	Under 100,000	100,000 to 1,000,000	1,000,000 to 5,000,000	Over 5,000,000
D	0	1	9	1
F	0	0	2	4
L	0	0	2	4
M	0	0	3	3
T	0	1	0	8
Z	0	0	1	5

In contrast with these figures it should be mentioned that one dairy supplying the city, the Fairlea Farms, has been subject for some years to voluntary bacteriological control, having, as we are informed, been examined weekly with counts almost uniformly under 10,000. A number of examinations of this milk were made in the laboratory of the Department of Public Health, during the winter and spring of 1915-16, with similar results, but the data were obtained for another purpose and are not included in the tabulation above.

In regard to the general quality of the milk supply of New Haven, Mr. O'Brien's data do not stand alone. Through the courtesy of Prof. L. F. Rettger we have been furnished with the results of 62 examinations of milk samples collected during the months of February to May, 1914, and examined in the Laboratories of Bacteriology and Hygiene of the Sheffield Scientific School by Messrs. N. Berman and R. R. Harkness. These investigators found 19 samples with counts under 100,000, 24 between 100,000 and 1,000,000, 12 between 1,000,000 and 5,000,000 and 7 over 5,000,000, showing as would be expected from the season of the year lower counts than ours. Even here, however, 19 out of 62 samples or 31 per cent were over the million mark. Furthermore Messrs. Berman and Harkness made a special test for the presence of the tubercle bacillus in the milk (which Mr. O'Brien did not do) and found it present in 4 out of 42 samples examined.

Ten years ago a similar though more extensive study of the bacteriological condition of the milk supply of New Haven was made by Dr. C. J. Bartlett, the results being published in full in the *New Haven Register* for October 21, 1906, and in the *Yale Medical Journal* for February, 1907. Professor Bartlett in the examination of 154 samples of milk found counts ranging from 5,000 to 17,500,000, two-thirds of the counts being over half a million. This study had much to do with promoting the inception of farm inspection in New Haven.

The high bacterial counts recorded by Messrs. O'Brien, Berman and Harkness do not in any sense indicate that the system of farm and store

inspection in force in New Haven has been at fault. We shall point out further on that the infant mortality of New Haven showed a marked and gratifying decrease in 1907, coincident with the beginning of the farm inspection work. High counts of bacteria in milk are frequently found rather as a result of imperfect cooling and consequent multiplication than of initially dirty milk, and this we believe to be the case in New Haven. Such bacterial multiplication can only be controlled by ordinances requiring the cooling of milk and in particular by systematic bacteriological control.

*Grade
milk
1907*

The ultimate object of the sanitarian in dealing with milk supply is to secure the pasteurization by adequate methods of all but a small amount of milk of special certified grade. Experience has made it amply clear that no raw milk is safe unless produced from tuberculin tested herds under sanitary conditions, which are so costly as to bring the price up to 15 or 20 cents a quart; and even milk of this latter type should in our judgment be pasteurized in the home in order to remove all possible danger. Modern methods of pasteurization offer a simple and efficient method of securing a safe supply at a reasonable cost. New York City has at last succeeded in securing a practically complete pasteurization of its milk supply; and this is the goal toward which most progressive health departments are aiming.

New Haven is fortunate in having one large milk supply, that of the New Haven Dairy, which is not only pasteurized but pasteurized in the final package, a metal capped bottle. The high counts found in six samples of this milk out of thirty examined (see table, page 62) suggest that the operation of the plant has not always been perfect, but the overwhelming superiority of this milk to the general supply of the city is indicated in the table, and the process is one which can, and should, be made to yield a uniformly excellent product. It is indeed the only ideally safe method since there is no possibility of infection in the sealed bottle after the heat is once applied.

The problem before New Haven is the securing of a milk supply which is either of certified grade or efficiently pasteurized. This cannot be done all at once. The proper procedure, as it has been worked out for New York City and more recently for New York State and many other places, is first of all to establish a grading system by which all milk shall be sold in receptacles, clearly marked as belonging to one of three grades, A, B or C, and as either raw or pasteurized. Grade A is for the use of children, Grade B for adults and Grade C for cooking only, and the grades are based on dairy scores and on bacteriological counts. After such a grading system has been in force it is possible step by step to educate the public as to the danger of raw milk of Grades C and B, and finally to

eliminate first one and then the other of these dangerous raw milks from the market.

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17V
Any organized campaign for the betterment of the milk supply must rest on a systematic study of bacterial content, which should be promptly provided for in the budget of the Health Department laboratory. Such determinations are of vastly more moment than the detection of low fat content milk. On the inspection side the control of pasteurizing plants is much more vital than farm or dairy inspection. Pasteurization by the so-called "flash" system (high heat for a short period) is entirely unreliable and no milk should be sold as pasteurized that has not been treated by the holding system (heated to 140° to 145° for thirty minutes). Yet the Board of Health at present exercises no control whatever over these plants, some of which are known to be operated on the flash system. A new inspector is to be added to the staff of the department in 1917 to be assigned as we understand to farm inspection. If he could be trained to supervise the operation of pasteurizing plants it would be far more valuable. We therefore make the following recommendations as to successive steps to be taken for the safeguarding of the milk supply of New Haven.

Recommendation XXII. That provision be made for the systematic bacteriological examination of all milk sold in New Haven, for the determination of the numbers of bacteria contained therein.

Recommendation XXIII. That a regulation be passed defining pasteurization as heating to at least 140° for at least 30 minutes, and that provision be made for systematic and frequent inspection of pasteurizing plants to see that these conditions are attained.

Recommendation XXIV. That all milk sold in New Haven be graded and labeled according to the general plan that has been followed by the New York State Department of Health and other official bodies.

Recommendation XXV. That every possible effort be made to secure as rapidly as may be feasible the pasteurization by the method defined above of all milk not of certified grade, under the supervision and control of the Board of Health.

Control of Communicable Diseases

This very important phase of health department activities is now governed by an ordinance very recently (February, 1917) adopted by the Board of Aldermen,—an ordinance which on the whole is adequate and satisfactory. There are three omissions from the list of reportable diseases,—chicken pox, malaria and rabies (or still better all dog bites),—which the Board of Health should remedy by special regulation as it has

the power to do. The reporting of chicken pox is desirable in view of the likelihood that this disease may be confused with smallpox, and malaria, as has been pointed out above, constitutes one of New Haven's important health problems.

The actual supervision of communicable diseases is in the hands of Dr. D. M. Lewis, bacteriologist to the department. He has all the laboratory work of the department to do, as well as the communicable disease control, with only the assistance of a technician in the former and of one sanitary inspector in the latter field.

The reporting of cases of communicable disease, which must be the basis for all effective control, is not yet as satisfactory as could be desired. A reasonably good idea of the completeness of reporting may be gained from a comparison of fatality rates (ratio of deaths to reported cases) on the assumption that actual fatality does not vary widely in different localities. The table below shows the recorded fatality rates for New Haven and New York for 1915 as given in *Public Health Reports* for June 30, 1916. It does not seem likely that diphtheria and typhoid fever were really much more severe in New Haven. It is more probable that about a quarter of the typhoid cases and about a third of the diphtheria cases escaped report. The small actual number of deaths from scarlet fever in New Haven makes this figure of little significance.

FATALITY RATES (DEATHS PER 100 REPORTED CASES)

	New York	New Haven
Diphtheria	8.4	12.8
Measles	1.6	1.7
Scarlet fever	2.9	1.0
Typhoid fever	13.5	17.1

All the above figures, both for New Haven and for New York, as well as those which could be cited for other communities, indicate that the reporting of cases of communicable disease is everywhere regrettably incomplete. This is so important a matter that we urge as

Recommendation XXVI. That special efforts be made to call to the attention of the medical profession the importance of prompt reporting of all cases of communicable disease and to secure the vigorous enforcement of the law which requires such notification.

In the past, deaths from communicable disease were reported to the Department of Health only by the undertaker. The new ordinance requires a report from the physician in attendance, a duplication of his report to the Registrar of Vital Statistics, which would be unnecessary if

the registration of vital statistics were under the Health Department as it should be.

Every case of acute communicable disease reported is personally investigated by Dr. Lewis and an epidemiological card is filled out which constitutes the original record of the case. An index file by residence is also maintained for all cases and carriers and charts are currently kept showing the distribution of each important disease by wards and by weeks. These records are most valuable, and in general the epidemiological work of Dr. Lewis is deserving of high praise. One device for getting in touch with early cases seems particularly praiseworthy. Whenever a child is absent from school for three half-sessions the teacher is requested to report the fact to Dr. Lewis. Such absentees are at once followed up if they reside in a neighborhood where communicable disease has been recorded, and this procedure makes it possible to find many new cases in their early and most dangerous stages.

The provisions in the new ordinance which govern isolation and disinfection, during and subsequent to cases of communicable disease, are reasonable and adequate. The city is fortunate in having admirable facilities at its disposal, for the isolation of patients who cannot be properly cared for at home, in the Isolation Ward of the New Haven Hospital. This building has 75 beds and patients sent by the Health Department are cared for at a charge to the city of \$2 a day. Eighty-eight patients were thus provided for in 1915 and 97 in 1916. The hospitalized cases in 1916 were distributed among the various diseases as follows: diphtheria, 19; poliomyelitis, 23; scarlet fever, 24; erysipelas, 14; ophthalmia or gonococcal infections of other types, 7; meningitis, 3; measles, 1; whooping cough, 5; chicken pox, 1. Nineteen cases out of 164 reported cases of diphtheria, and 24 out of 185 reported cases of scarlet fever seem a small proportion to require hospital care at city expense. In New Haven, as elsewhere, it is probable that many cases of typhoid fever are treated at home which might be better cared for in the general ward of a hospital.

Judging from general experience elsewhere it seems doubtful whether the city of New Haven is taking full advantage of the isolation building to which it contributed half the cost of construction. We have been informed by persons conversant with the situation that cases are at times now cared for at home which in the public interest and for their own sake might better receive hospital care, and could do so if appropriations for this purpose were increased.

Recommendation XXVII. That the opportunities for hospital isolation offered by the Isolation Building of the New Haven Hospital be more fully utilized, and that cases of typhoid fever be hospitalized whenever they cannot be properly cared for at home.

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One of the particularly noteworthy aspects of communicable disease control in New Haven is the emphasis laid upon the carrier, a person who may be well or only suffering from comparatively slight chronic symptoms and yet is cultivating in his body and distributing to others the virulent germs of disease. The new communicable disease ordinance specifically provides for the isolation of carriers on the same terms as persons who are actively sick. Dr. Lewis has laid special stress on this danger in his own work, and has succeeded in locating such carriers and in checking local outbreaks of disease due to them in a number of instances in which the methods ordinarily used by health departments would have failed. He has made real contributions to epidemiology in this regard.

Another thing for which the Department of Health deserves special credit is the abandonment of fumigation as a routine procedure after the termination of a case of communicable disease. Experience has shown very clearly in recent years that it is rather people than things that carry pathogenic germs. If proper isolation and systematic disinfection of discharges have been secured during the course of the disease terminal fumigation will generally be unnecessary; if these conditions have not been secured terminal fumigation will be useless, for other susceptible members of the household will long since have been exposed. Fumigation is still performed in particular instances where it may seem desirable. Its abandonment as a routine procedure marks a decided step forward, involving a material saving of money, and tending toward sound education of the medical profession and the public as to the real mechanism of disease transmission.

In the matter of dealing with carriers Dr. Lewis's practice differs from the usual health department procedure in the direction of greater stringency and the results he has obtained seem to justify his position. In certain other respects, however, we feel that his departure from currently accepted standards is less fortunate. He isolates diphtheria for example for a minimum period of ten days and then releases those patients who show no clinical signs of disease of the nasopharynx, instead of requiring two successive negative bacteriological cultures to be taken from nose and throat to show the absence of the infective organism. So with scarlet fever he releases patients after three weeks (instead of the usual 30 days) unless there are clinical signs of persisting disease. Even more objectionable seems to us the practice of isolating exposed nonimmunes, only if disease of the nasopharynx is apparent. The universal procedure elsewhere is to isolate all diphtheria contacts until negative cultures have been obtained from nose and throat, and all scarlet fever contacts until the usual incubation period of the disease has passed. It may be that Dr. Lewis is able to separate infected persons from others by inspection of

the nasopharynx. He believes that no untoward results have followed the new policy. In view, however, of the grave doubts felt by competent diagnosticians as to the safety of such a procedure we are of the opinion that the public should be given the benefit of the doubt and the usually accepted rules followed as a minimum.

Recommendation XXVIII. That the promising policies of the Department of Health in the treatment of carriers be continued, but that they be supplemented by such measures of control of frank cases and contacts as are generally considered wise and necessary by recognized sanitary authorities.

There is one other point in regard to communicable diseases to which we feel regretfully compelled to refer. The courage to seek new truth and devise new methods of work is the very life of science, and the originality of Dr. Lewis is an asset of which the New Haven Department of Health may well feel proud. The proper place to present new ideas, however, is before a jury capable of estimating their value, in scientific meetings and in scientific periodicals. Not all new ideas are true ones and original conceptions must be tried out and gradually established by other workers before they can be accepted. The educational literature published by a health department should not include controversial matter. There are plenty of established truths to be taught, and to put forth purely personal views, at variance with those of the vast body of scientific men, in popular bulletins, with official sanction, can only lead to confusion and a lack of confidence fatal to the influence of the body promulgating them. Both the annual and the monthly bulletins of the New Haven department have suffered from a failure to recognize this sound rule of conduct.

The monthly bulletin for March, 1916, for example, contained an article accusing physicians of filling out "inaccurate and misleading" death certificates based on "guess work." In the annual reports of the department cases reported by physicians as due to diphtheria, scarlet fever, etc., are subdivided according to Dr. Lewis's personal views into half a dozen different maladies on the assumption that the physician's diagnosis was erroneous. Such criticisms should be offered before the County Medical Society, not in a popular bulletin. The issue for July contains the statement that "in the use of a 1 per cent solution of camphor and eucalyptol in mineral oil we have a sure cure of diphtheria and scarlet fever carriers"; and it is added "Thus, the bag of camphor worn by our ancestors was not irrational." It is safe to say that the general consensus of the best medical opinion would condemn these statements as unjustified by any evidence yet presented. In the bulletin for August and October are discussions of the epidemiology of infant paralysis in which it is quite clearly stated that there are two types of this disease, one "of a

sporadic type, the paralysis only giving the diagnosis, a type apparently not contagious and not fatal; secondly, a type called highly contagious and frequently fatal." This is exceedingly important if true; but no such distinction is recognized by any of the leading authorities who have devoted years to the study of this disease.

It is obvious that the dissemination of views of this sort (whether inherently justified or not) in popular bulletins can only tend to alienate from the Health Department the physicians whose support is so essential to its success, and can only produce in the mind of the public confusion and lack of confidence in either health authorities or the medical profession.

Recommendation XXIX. That information disseminated to the general public through the medium of the annual report, monthly bulletin and other publications of the Department of Health be confined to those scientific facts which are generally accepted by competent leaders in the fields of medicine and public health, novel and controversial opinions being presented to the proper audience through the medium of the scientific press.

No specific criticisms should obscure the fact that the policies of the Health Department in regard to communicable diseases are in general aggressive and forward-looking.

Markedly satisfactory results have already been attained in regard to typhoid fever, the death rate for this disease having dropped from 24.4 per 100,000 for the five years 1907-11 to 15.1 for the five years 1912-16, and to 8.0 per 100,000 for the last of these years, 1916. The other communicable diseases except measles show a gradual improvement as indicated below. Nineteen sixteen was a low year for diphtheria and measles, a fairly high year for scarlet fever and whooping cough.

DEATH RATES PER 100,000 FOR COMMON COMMUNICABLE DISEASES

	Diphtheria	Scarlet Fever	Measles	Whooping Cough	Typhoid Fever
1907-11	18.4	7.5	7.2	12.6	24.4
1912-16	17.0	4.6	9.4	7.8	15.1

It is impossible to attain the most satisfactory results without materially strengthening the staff assigned to this very important phase of health department activity. A portion of the time of one physician with the assistance of one inspector is inadequate for the proper control of communicable disease in a city the size of New Haven. Dr. Wright in his letter of April 18 urged the need of "nurses for the bureau of com-

municable diseases for follow-up work" and of a "city diagnostician at least for cases that are cared for at the expense of the municipality." Dr. Lewis believes that he should be given two nurses, particularly for the work of locating nasal carriers, and a clerk to assist in the statistical work of the office.

More help is certainly needed. We are inclined to believe that the first step to be taken in this direction is the freeing of Dr. Lewis from the responsibility of the laboratory, which is really a separate problem demanding the entire attention of a specialist. The control of communicable disease, particularly by attention to the carrier problem, is the special work in which Dr. Lewis has demonstrated particular ability. If relieved of the laboratory work we believe that concentration upon this task would be even more fruitful of results; and under such conditions one nurse and a clerical assistant should prove adequate for immediate needs. We therefore suggest:

Recommendation XXX. That Dr. Lewis be relieved of responsibility for the laboratory of the Health Department and permitted to devote himself to the problems of communicable disease control; and that he be provided with a public health nurse at \$1000 and a clerk at \$600 for the adequate prosecution of this work.

The department furnishes diphtheria antitoxin and smallpox vaccine free to all who cannot afford to pay for them. It also provides physicians on request with typhoid vaccine or anti-rabic virus. The continued high death rate from diphtheria, here as everywhere,—for New Haven is not peculiar in this respect,—is a reproach to modern public health science; and typhoid and smallpox vaccines should be used much more widely than at present. We would therefore urge as

Recommendation XXXI. That the Department of Health undertake a vigorous educational campaign among physicians and the general public in the interest of a more general and more prompt use of diphtheria antitoxin and a wider protection of the public against typhoid and smallpox by the use of vaccines.

The Health Department Laboratory

A well-organized laboratory is one of the most essential elements in a modern public health campaign; and this is one aspect of health work in New Haven which seems to us to call for radical improvements.

All the diagnostic and laboratory work of the department is done by Dr. Lewis, in such time as he can spare from his epidemiological duties, with the aid of one technician. The chemical and microscopical examination of milk, to which reference has been made above, and the diag-

nostic tests for diphtheria, typhoid fever and tuberculosis, constitute the great proportion of the work. In 1915 there were made 5033 milk analyses, 4117 examinations for diphtheria, 540 for typhoid fever, and 626 for tuberculosis, with 259 examinations of water and 495 miscellaneous tests.

For the diagnosis of diphtheria, only a swab is distributed without the usual accompanying serum tube. Swabs which come in during the daytime are at once inoculated upon serum, but no direct examination is made of the swab. Swabs which come in after 7 p.m. are planted upon serum *by the police officer who happens to be in charge at the police station.* The procedure in force in the best laboratories is to supply the physician with both swab and serum. He inoculates the serum himself, and if it arrives at the laboratory during the night, provision is made for dropping it through a slot directly into the incubator so that it is ready for examination in the morning.

Blood for the Widal test in typhoid fever is collected and sent in to the laboratory dried on a paper slip instead of on metal or glass. We are of the opinion that the difficulty in dissolving out all the material absorbed by the meshes of the paper constitutes a possible source of error in this procedure.

A few samples are examined in the laboratory in cases of malaria, meningitis and other diseases. No feces examinations are made to detect typhoid carriers. No Wassermann tests are made, no examinations are made for the bacillus of whooping cough, and no work is done on the identification of types of pneumococci, a procedure which is coming to be of great importance in connection with the new serum treatment of pneumonia.

In general, we are of the opinion that the work of the laboratory should be materially extended in scope and standardized and improved in method. To this end it should be recognized as constituting an important branch of department work distinct from epidemiology, and it should receive much more generous support than it does at present. We would strongly urge as

Recommendation XXXII. That the laboratory work of the Department of Health be separated from the medical work of communicable disease control and placed under the direction of a bacteriologist at \$2000 with an assistant chemist at \$1200 and the present technician to assist him; that the work of the laboratory be reorganized along the generally accepted lines of standard procedure and expanded as rapidly as possible to include quantitative bacteriological examination of milk, Wassermann tests, examination for typhoid carriers, and identification of pneumococcal types for assistance in the administration of sera.

Vital Statistics

The reports of births, deaths and marriages in New Haven are made to a special officer, the Registrar of Vital Statistics, entirely independent of the Department of Health. This is an unfortunate arrangement because the collection of mortality statistics in particular requires considerable expert knowledge. Death returns as they are filed are frequently incomplete and unsatisfactory as regards the causes of death, and in order that they may be adequate each return should be checked up and if the cause of death is not returned under one of the headings accepted by vital statisticians the matter should be cleared up by correspondence with the physician in question.

The present plan is also a needlessly costly one. The Registrar of Vital Statistics receives a salary of \$2000, and employs two clerks, the total cost of the office being \$4700 a year aside from \$2150 paid out in fees, etc. This staff simply records the returns received and files the necessary duplicates at Hartford, but does nothing whatever in the way of tabulating and analyzing data. For such purely routine work the cost is exorbitant. An expert statistician at \$2000, with one clerk at \$1000 and with the clerical assistance now devoted to the tabulation of data by the Department of Health, should be able to accomplish all and more than is done at present. In the interest of both efficiency and economy we urge as

Recommendation XXXIII. That the office of Registrar of Vital Statistics be abolished and that a statistician at \$2000 and a clerk at \$1000 be added to the staff of the Department of Health.

The analysis of vital statistics prepared by the Health Department is presented in the form of seven tables in its annual report. These tables show deaths by months and wards, deaths in public institutions by months, deaths by principal causes and months, and deaths by principal causes and age and sex. Under each of the last two headings (causes and months, and causes and age and sex) there are two tables, one giving certain principal causes of death individually, and the second, larger groups of causes (epidemic, general, nervous, and the like). The latter groups of causes are too large and indefinite to be of value and these tables might be omitted with advantage. Even the causes of death given in the more extended tables are in many instances groupings of two or more items which should be distinguished according to the accepted standard classification. There are no data given for five of the most important correlations, as follows:—sex and age, ward and sex, ward and age, ward and nativity, ward and cause. There are no death rates by principal

diseases, no infant mortality rates, and no birth rates. All these data are generally recognized as essential elements in a statistical report.

The Health Department cannot be blamed for these rather serious deficiencies since it has no special appropriation for statistical work and no trained statistician on its staff. On the other hand the shortcomings indicated should certainly be remedied, since under present conditions the valuable statistical data which the registration returns of the city might furnish are being in large measure wasted, while the Health Department is without many of the essential facts which should guide an intelligent public health campaign.

If our last recommendation should be carried out, the statistician thus provided should be able to do the tabulating required. If not, a special statistician should be added to the staff of the department to analyze the data received from the Registrar of Vital Statistics. In any case we suggest as

Recommendation XXXIV. That the vital statistics published in the annual report of the Department of Health be extended and modified so as to present the fundamental data generally recognized as essential by vital statisticians.

Prevention of Infant Mortality

The control of infant mortality by an organized campaign for the education of mothers is the most important and most fruitful of all the possible activities of the Department of Health. Two recent attempts have been made (by Dr. C. V. Chapin, Health Officer of Providence, R. I., and by Mr. Franz Schneider, Jr., Sanitarian, of the Russell Sage Foundation) to estimate the relative value in terms of life saving of the various divisions of public health activity. Both these authorities assigned to infant welfare 20 per cent of the weight attached to the entire health program as a whole. Yet this field, representing one-fifth of all the possibilities of health department effort, has as yet received but slight official recognition in New Haven.

Fortunately the public spirit of the community has stepped into the breach and through two private organizations, the Infant Welfare Association and the Visiting Nurse Association, has to a considerable extent filled this serious gap in our defenses against preventable disease. The initiative in raising funds for this work, and its general direction, is due to the Infant Welfare Association; its actual conduct is in the hands of the Visiting Nurse Association, which organization also supplies a substantial proportion of the necessary financial support.

The infant welfare station is the central feature of the campaign against infant mortality; and five such stations are now maintained

throughout the year at the following points: the New Haven Dispensary, Lowell House, Neighborhood House, Dixwell Avenue Congregational Church, and in Fair Haven. Rent and gas are supplied free at all stations and the services of the medical staff are given without charge. Weekly conferences with mothers are held at each station throughout the year, and between May 15 and October 1 high-grade milk is distributed. This milk is furnished at ten cents a quart by the Fairlea and Hayland farms and is sold approximately at cost. Those who cannot afford to pay for milk are supplied by the generosity of Mr. Lee of the Fairlea and Mr. Stoddard of the Hayland farms, each of whom donates 1000 quarts of milk for this purpose. Emphasis is, however, properly laid at the stations upon breast feeding rather than upon the supply of a substitute in the form of clean milk, for the supreme task of the milk station is an educational one and its aim is the training of the individual mother in all the technique of infant care.

One of the most essential parts of the activity of the welfare station is the educational follow-up work. During the summer months four nurses and three assistants are employed, at an expense to the Infant Welfare Association of approximately \$2500. During the winter three nurses and two assistants are engaged in this work at the expense of the Visiting Nurse Association, amounting to a contribution to the cause of about \$2000.

The average attendance at the stations during the summer of 1916 was 460, the maximum 600. In winter the numbers vary between 350 and 450. The conduct of the work seems in all respects admirable and the results have been most gratifying. In 1915, 958 babies were enrolled of whom only 28, or 2.9 per cent, died; in 1916, 1021 were enrolled, of whom 33, or 3.2 per cent, died.

The part taken by the Health Department in this work has been the assignment of school nurses during a part of the summer to visit the tenements, and give instruction in infant care and home sanitation. Circulars have been distributed by these nurses, including Advice to Housekeepers, Directions for the Care of Milk and directions for modifying milk for infant feeding. This work has produced gratifying results in the improvement of living conditions in the homes of the poor. For the present year Dr. Wright has obtained an increased appropriation which will make it possible to keep all the school nurses on the pay roll for eleven months and to develop this summer work much more extensively. This is a highly commendable step. In order that a maximum of efficiency may be attained it is essential that the activities of these Health Department nurses should be closely correlated with those of the Visiting Nurses. We therefore suggest as



FIG. XVII

A FEW PRODUCTS OF THE INFANT WELFARE STATION

Courtesy of the Visiting Nurse Association

Recommendation XXXV. That a definite plan for coöperation in the summer campaign against infant mortality be worked out by conference between the Department of Health and the Infant Welfare Association.

The infant mortality rate of New Haven, as will be pointed out in a later section, is a very satisfactory one in comparison with that of other cities,—a condition which reflects great credit on the city and its various health agencies. Dr. Lewis believes that improvements in the milk supply have had much to do with the reduction in infant diarrhea since 1909; and the figures seem to bear out this contention although the milk supply as we have seen is still very far from an ideal one. The splendid work of the Infant Welfare Association and the Visiting Nurse Association is no doubt a large element in the drop since 1912. The strong tendency of Italian mothers to nurse their babies, and the generally high level of intelligence and of prosperity in the community are all vital factors to be taken into account.

The fact that only 9 babies out of 100 die before reaching their first year of life is gratifying by comparison with the record of many other cities, but offers no excuse for standing still in the good work. New Haven's natural advantages and the good start that has been made should inspire rather than discourage further advance; for there is yet much that remains to do.

In the first place there is need for a sixth Infant Welfare Station in the vicinity of State Street. Generally accepted standards call for one station to every 20,000 population, making seven or eight stations for a city the size of New Haven, but for the present at least one more station, in this district, would seem to us adequate.

In the second place it is most desirable that provision should be made for supervision of midwives. More than half the deliveries in New Haven are made by midwives, and the visiting nurses tell us that almost all the cases of sore eyes seen by them are among this group. The midwives in Connecticut must pass a state examination, but in addition they should be locally registered and supervised; even without legal authority (which the city could probably not assume), the moral influence of supervision would be considerable, and individuals who might prove definitely recalcitrant could be reported to the state board of examiners for the withdrawal of their license.

Thirdly, prenatal work is very sorely needed. Such work in Boston has reduced the infant death rate to less than one-half of the rate among babies not receiving prenatal care. Prenatal work is now conducted in connection with the dispensary station but nowhere else. Provision for the education of prospective mothers at the other four stations would undoubtedly be the means of saving many lives.

9 Finally, the establishment of Little Mothers' League classes for the instruction of the girls who must generally care for their baby brothers and sisters has in other cities proved a most valuable element in the infant welfare movement. Summer talks to school children (35 of them during 1916) have been given for the past three seasons by the Visiting Nurse Association at the expense of the Civic Federation. School Health Leagues were organized by the Department of Health in 1915-16. These are good beginnings, but the work should be developed and organized to extend throughout the school year.

Another point which is much in need of attention here and elsewhere is the health of the child between infancy and entrance into school (ages two to six). After the child leaves the welfare station and before it comes under the observation of the school medical inspector there is a serious gap, and it is most desirable that some machinery should be provided for supervising the child during this period of its life.

|||| To provide thoroughly adequate machinery for the protection of the infants of New Haven we are of the opinion that at least three full time nurses are required in addition to the service now contributed by the Infant Welfare Association and the Visiting Nurse Association; and this additional provision should clearly be made by the city itself, which has so far taken so little part in this vital work. The Health Department has not been blind to this need. In his report for 1915, Dr. Wright pointed out that "three welfare nurses would be profitably employed at all seasons and that more direct results can be obtained than from any other measures of equal cost."

The conduct of infant mortality work logically belongs in its entirety to the Department of Health, and in the future should ultimately be conducted under official auspices. In most cities, however, there is a more or less close coöperation with private agencies which share a part of the burden. In New Haven two-thirds of all the work that seems necessary is already being carried by the Infant Welfare Association and the Visiting Nurse Association; and it is being carried in a wholly ideal way. In view of these facts we are inclined to believe that the most satisfactory results would be obtained for the present by placing the funds necessary for expanding the work in the hands of the organizations which have begun it so successfully. We therefore urge as

Recommendation XXXVI. That the city appropriate the sum of \$3000 annually to be expended by the Infant Welfare Association and the Visiting Nurse Association for the establishment of an additional station and for further Infant Welfare work, particularly along the lines of prenatal care and the organization of Little Mothers' Leagues.

The supervision of midwives on the other hand is obviously a function

which should be directly exercised by the Department of Health. We suggest as

Recommendation XXXVII. That an obstetrical nurse at a salary of \$1200 be added to the staff of the Department of Health to supervise the work of registered midwives.

Medical School Inspection

Medical school inspection in New Haven was commenced February 1, 1913, with the appointment of two physicians. A third was added January 1, 1916. There are seven school nurses. This force is appointed and controlled by the Board of Health.

The grammar schools, 52 in number, containing 21,708 children, are divided about equally among the three doctors and seven nurses, the latter also doing some work in the parochial schools. There is no medical supervision of the high schools with 3363 pupils, the Boardman Apprentice Shops with approximately 200 pupils, the Kindergartens with 2525 pupils, and the parochial schools with 3500—a total of approximately 9600.

Physical examination is commenced with the first grade (five to six years) in each school, each succeeding grade being examined in turn. As a rule the first five grades are completed and sometimes the sixth is started within a year.

The Medical Inspectors are on duty during school hours. They examine superficially the eyes, ears, nose, throat, teeth, and cervical lymph nodes. Stripping of the children is not permitted, so that proper examination of the heart and lungs and examination for orthopedic deformities are not possible.

Where certain defects are discovered, a form is filled out and signed, calling attention to the fact, with the advice to the parents that the child should receive the attention of its family physician. Such advice may or may not be followed. A new system has been recently introduced whereby it is hoped to determine what percentage of such recommendations is followed out.

In addition to the routine examinations, the Medical Inspectors are on call for emergency cases, such as accidents and suspicious contagious diseases.

During the spring and fall they vaccinate against smallpox those children who have not already been recently vaccinated, unless a physician's certificate is brought exempting them on physical grounds.

In 1915 the two school physicians made 9784 inspections and found 586 cases of contagious and parasitic disease and 2200 physical defects. In 1916 the three school physicians made 11,350 inspections and found 782 cases of contagious and parasitic disease and 3125 physical defects.

The nurses are on duty from 9 a.m. to 5 p.m. During school hours they inspect such children as are referred to them by the teachers, for pediculosis, ringworm, and impetigo. They also treat these conditions, when found, under restrictions formulated by the Board of Health. After school hours they accompany certain children to the hospital or dispensary, and do a certain amount of home visiting.

With a little training, the teachers could with very little expenditure of time do much of the inspection now done by the nurses, and the nurses could do most of that now done by the physicians and in addition the essential follow-up work outside of school.

The lack of adequate and effective follow-up work seems to us one of the most serious defects in the present system. A special study was made by Mrs. B. H. Bartlett, R.N., a graduate student in the Department of Nursing and Health of Teachers College, of the efficiency of the work of the New Haven school nurses in comparison with the work accomplished in New York City, Newark, N. J., and Montclair, N. J. Mrs. Bartlett points out that

"1. There is no one at the head of the staff who understands the various phases of school nursing or who can comprehensively direct their work.

"2. Under the present system there is no way of judging what kind of work is being done or how efficient each nurse is, as each one works independently.

"3. There are no requirements demanded of the women employed on the staff as to whether they are graduates of a good training school or registered nurses in the state.

"4. The salary of \$65 is not sufficient to attract the best type of nurses into the work unless they live at home and are not self-supporting. As there is no chance of promotion, and no efficiency marks, there is naturally little incentive to do the highest kind of work.*

"5. There are no routine directions as to technique in individual or class instructions at school as each nurse follows her own plan. This brings confusion to both teachers and pupils when a new nurse enters a school.

"6. At present a great deal of time must be wasted at the school through mismanagement, as a nurse can easily inspect two schools a day instead of one. Arrangements should be made with the principal and teachers of each class when the nurse should be in her office. Thus time would be spared in waiting for the various classes to assemble in the nurse's office.

*The salaries of the nurses have been increased for the present year to \$75 a month for eleven months of service.

"7. The number of home visits per nurse is far below the average in other cities. This important part of the work has been overlooked, and little improvement can be made until a better system of follow-up work can be done to join the home and the school.

"8. Efficient work cannot long be expected from untrained or un-directed workers, nor will a small salary hold the best nurse who understands she is not paid enough for full time work which requires her time and skill. For permanent betterment of the work there should be a reorganization of the staff, skilled workers, careful administration, adequate remuneration, complete records, better examining rooms, more clinics, and a careful system of following up all physical defects of the school children."

An analysis of the recorded work of the nurses makes it clear that Mrs. Bartlett's strictures are in the main justified. In 1915 the nurses made 2796 visits to schools and 2329 visits to homes. In 1916 the corresponding numbers were 2624 and 2540. This means that each nurse made between one and two school visits and between one and two home visits a day. In New York City each nurse averages three schools a day and five home calls.

We have been favorably impressed with the ability and the enthusiasm of certain of the nurses engaged in this work. It seems obvious, however, that closer administrative supervision of the work of the staff as a whole would be desirable.

Furthermore, we believe as suggested above that a fundamental readjustment of the work of physicians, nurses and teachers would prove of advantage. Such a readjustment would permit the services of the three Medical Inspectors to be utilized for work in School Medical Clinics, the establishment of which would be a distinct advance. The benefits of such clinics may be briefly stated as follows:

1. They form a necessary complement to the preliminary work of school medical inspection which experience has shown can be satisfactorily performed by teachers and nurses.
2. They permit the trained physician to be utilized for a more thorough examination of serious or puzzling cases than is possible in the ordinary routine of medical inspection.
3. Being an integral part of the school machinery, they work in the closest relation with teachers, attendance officers, and nurses, at a minimum of time and maximum of convenience for children and doctors.
4. They are available not only for the skilled diagnosis of such cases as the inspection of teachers and nurses may develop, but permit the necessary continuous observation and adequate treatment of such chronic conditions as discharging ears, favus, ringworm, scabies, etc., at a great

9 saving of the health of the school children and their school hours. The average parent of public school children cannot afford the expert services of aurist, oculist, etc., such as would be provided by a school clinic. Discharging ears, for instance, need daily attention, such as syringing, etc. Experience has shown that parents rarely carry out, even if fitted to do so, the advice of their family physicians; a large part of a nurse's time is occupied in the attempt to see, by visits to the home, if treatments are carried out. This is a long and tedious task and the work is rarely effective. It is estimated that nine-tenths of the cases of discharging ears among school children have been neglected in the past, with a large number of cases resulting in deafness. Likewise, the removal of enlarged tonsils and adenoids cannot be best handled by the average family physician. The modern treatment for ringworm is by the use of the X-ray. How many physicians are in a position to offer such treatment? Instances might be multiplied. With the organization of the school clinic, most of such difficulties disappear. It is designed to care for the conditions most commonly met with in the school, at a minimum of time, with a maximum of efficiency, and at great saving in expense.

5. Such clinics permit a rational control of open-air classes, special classes for the deaf and dumb, the subnormal and backward, and the gradation of all children on a physiological basis as contrasted with the present irrational chronological one.

6. They serve as a medium of coöperation between the school and other agencies, such as the Bureau of Communicable Disease for epidemiological studies and the Department of Physical Education for the correction of various physical defects, many of which are the result of school attendance, and for which the school authorities might properly be held responsible.

7. They permit the recording and filing of the results of the examinations made and offer an opportunity for the necessary study of such results.

Probably the greatest need in connection with the present system is the need of a Supervisor, a physician specially trained in educational hygiene and having experience in this field. Efficient leadership is essential to scientific control of all successful organizations and a carefully selected man would supply the necessary inspiration and cohesive power which are fundamental to success. Besides providing leadership, such a man could take active part in the Medical Clinic and supply much needed educational training in hygiene for children, parents, teachers, and janitors. He would correlate all those activities relative to the school child's health and normal development, medical inspection, and physical exami-

nation, school medical clinic, physical education, school sanitation, etc. He should be provided with two special clinic nurses and a clerk for record keeping in addition to medical inspectors as at present provided.

The other vital need of the department in this connection is for a well-trained and experienced Supervising Nurse who could supply leadership and coördination to the nursing staff which we are convinced is not at present functioning with a maximum of efficiency. She might also very properly be entrusted with the supervision of the conduct by the Visiting Nurse Association of the infant welfare and tuberculosis work, which we suggest should be financed by grants from the City Treasury.

The provision of dental clinics and of special education in mouth hygiene is coming to be recognized as one of the most important health problems. The New Haven Department of Health has made a good beginning along this line by the appointment of one dentist and one assistant, and by the conduct of a peripatetic clinic which is moved from school to school giving treatment to the teeth of the six-year-old children. Bridgeport, which has been a pioneer in this field, now has a staff of two dentists and twenty-two dental hygienists, stress being laid almost wholly on dental prophylaxis rather than on the treatment of cavities after they have already developed. We believe this service should be extended in New Haven as rapidly as funds can be obtained.

With a view to the most complete and satisfactory development of the essential work of preserving the health of the future citizens of New Haven, we urge as

Recommendation XXXVIII. That the work of medical school inspection be reorganized and expanded along the lines laid down in this report, to include the organization of medical clinics, with the provision of the following new appointees in addition to the present staff: a Medical Supervisor at \$2500; a Supervising Nurse at \$2000; two clinic nurses at \$850 each; a clerk at \$750; an additional dentist at \$1000; and an additional dentist's assistant at \$400.

Sanitation of School Buildings

Although not properly a problem of health organization, a word may perhaps be said at this point, in connection with the general subject of school hygiene, in regard to the sanitary conditions of the public school buildings, a subject which has been studied in some detail by one of us (J. C. G.).

An inspector maintained by the Board of Education, a trained engineer, is doing excellent work in the supervision of sanitary conditions; and the

attitude of the Board in all matters relating to the health of the school children is deserving of praise.

The school buildings are of all types, five of wood construction, one of brick and wood, the rest of brick. The number of rooms varies from two to nineteen in the grammar schools. Schools are also maintained in six buildings not owned by the school district. As might be expected, the school buildings represent the evolution of the science of school sanitation. The newer buildings are thoroughly up to date, the older ones leave much to be desired.

Seventeen of the school buildings are provided with plenum systems of ventilation, the rest with gravity systems. The teachers are held responsible for air conditions in their rooms. They are required to post the temperature on the blackboard every half hour, and are supposed to maintain the thermometer at 68° or below. Some of the classrooms are overcrowded, resulting in a disturbance of ventilating conditions and frequently in an improper position of the pupil with respect to light. Many of the rooms are not supplied with adjustable desks, an important matter which should receive attention. Many postural deformities are the result of poorly fitting desks.

Drinking fountains are for the most part unsatisfactory in type. Many are makeshifts placed in the sinks; none have proper guards to prevent direct contact between the mouths of the children and the water outlet. They are of the continuous flow type for the most part, and either because of a low water pressure or because of a desire to economize in water, the streams practically necessitate the direct application of the mouth to the spigot. Recent bacteriological studies would seem to indicate the desirability of replacing the present vertical stream type with a fountain in which the discharge comes off at an angle so that the water after being in contact with the mouth will fall into the basin and not on the top of the spigot.

Toilets are of various kinds. Those in the new schools are excellent, those in the older very bad. In several schools, the old outside toilet remains, a very objectionable condition. The urinals are usually less satisfactory in type than the toilets. No common towels or drinking cups have been seen, though in some places paper towels are not always provided.

Several of the newer school buildings are equipped with electric vacuum cleaners. The schoolroom floors of those buildings not so equipped should receive a dust-laying preparation. The general cleanliness of the floors, windows, etc., is excellent.

While the above-mentioned defects are mentioned, it should be stated in fairness that the members of the Board of Education realize the con-

ditions as they exist and are attempting to improve conditions as rapidly as the funds available permit. Further appropriations for this purpose should be provided.

It is desirable that all school-teachers and janitors should receive instruction in general school sanitation. Their position is a responsible one. For instance, no other class of individuals about the school building has more influence over conditions which affect the health of the pupils than the janitors. They should be taught not only how to operate a fan mechanically, but why fresh air is necessary. They should understand why dusting and sweeping are undesirable during school hours; it is still practiced in some of the New Haven schools at present.

Open-air classes are maintained in two schools, the Edwards Street School and the Prince Street School. The second of these, a class of 37 pupils, was inspected by one of us (J. C. G.). Of the 37 children, 5 were definitely tuberculous, 8 were under suspicion, and the rest were suffering from malnutrition from various causes. Complete physical examinations are made, hemoglobin estimated, and the weights of these children recorded once a month. Physically, a definite improvement has been noted in all. Warm clothing and a nourishing hot beverage of cocoa, milk, or gruel is supplied by friends of the school.

In the Green Street and Washington Hooker schools, a room is kept with the windows open in which special classes are held. Each school building should be provided with such a room, where weak, anemic, or otherwise sickly children may receive schooling. Warm covers and a hot drink should be provided for these children, as is done for those in the fresh-air class.

Additional special classes should be provided for children below par mentally and for those having defects of speech.

Control of Tuberculosis

Next to infant mortality tuberculosis presents greater possibilities of life saving, of a tangible reduction in the death rate, than any other problem within the province of the health department. The estimates by Chapin and Schneider of the relative importance of various health procedures assign respectively 10 per cent and 12 per cent of the total value of all health activities to anti-tuberculosis work. In New Haven, however, almost the whole of this important phase of public health work has been left to private and unofficial agencies.

The Board of Health does of course require the reporting of tuberculosis, and as we have seen furnishes the usual laboratory facilities for diagnosis. The reporting is still incomplete, but compares very well with

the results obtained in other cities. On death or removal of a case the home is visited by the sanitary inspector assigned to work under Dr. Lewis and instructions are given in regard to cleansing, and disinfection is done where necessary. No visits are made to cases reported unless death or removal occurs.

As in the case of infant welfare, private agencies have gone far to supplement the lack of official initiative in this matter. An effective dispensary system is the first essential in a campaign against tuberculosis; and the New Haven Dispensary has furnished admirable facilities of this kind (under the direction of Dr. F. B. Standish). Three afternoon clinics (for men, women and children, respectively) are held and one evening clinic. The total number of new cases registered at these clinics during 1916 was 282 and the number of visits paid to the clinics was 1484. Dr. Standish believes that the time has come for the extension of this work by the establishment of branch dispensaries to reach other sections of the city more directly, and suggests the Grand Avenue district as the one most in need of such facilities. We are heartily in accord with this suggestion, and believe that with this exception present dispensary facilities for dealing with tuberculosis are entirely adequate and satisfactory.

The tuberculosis nursing work in connection with the dispensary is done by the Visiting Nurse Association, five nurses being assigned to this service. This work, like everything else undertaken by the V. N. A., appears to be carried out in an admirable manner. The number of nurses available is not, however, sufficient to do all that is necessary, particularly along the line of searching out incipient cases in the environment of those already known to be affected. The secret of success in anti-tuberculosis work lies in beginning treatment at the earliest possible moment, and as a general rule there will be found in the family of each frank case at least one incipient case in just the stage to profit most by hygienic care. We believe that one of the most important things to be done in connection with the anti-tuberculosis campaign in New Haven is the extension of the work of instructive public health nursing in regard to this disease, and we feel that at least three more nurses should be employed in order to cover the ground properly.

One of the most valuable agencies in combating tuberculosis is the Day Camp in which children from tuberculous families (who in a large majority of cases are already affected with the disease in incipient form) can be put in condition to resist its ravages by outdoor life and hygienic instruction. The New Haven Hospital has for three years financed such a Day Camp in West Haven under the management of the Visiting Nurse Association. The camp has been kept open only during the summer.



FIG. XVIII
RECEPTION INFIRMARY OF THE GAYLORD FARM SANATORIUM
Courtesy of the New Haven County Anti-Tuberculosis Association

Attendance has averaged about 85 a day and the results, according to the physicians and nurses closely in touch with them, have been most gratifying. The cost of maintaining the Day Camp is about \$2000 a year, and we understand that the hospital authorities are considering its abandonment on the ground of expense. We believe that this would be most unfortunate, for the leading experts on tuberculosis are laying increasing stress on such work as is done in the Day Camp as perhaps the most fruitful of all lines of endeavor in the anti-tuberculosis field. Dr. D. R. Lyman writes us in connection with this question: "I sincerely trust the Day Camp will be not only continued but enlarged. If, as you suggest, we could only through our nurses and dispensaries get hold of the latent or pretubercular cases in the families where there has been open chronic tuberculosis, and could then through a day camp run *all the year round* build up these little cases and carry them until they are able to go to work, we would save the community many times the expense in the long run." We feel, however, that work of this kind, which is essentially preventive in nature, should logically be supported at public expense and not by the New Haven Hospital.

For hospital treatment of tuberculosis, New Haven has the facilities of the four state sanatoria at Hartford, Meriden, Norwich and Shelton, with 565 beds. We understand that the State Tuberculosis Commission is asking for the addition of 60 beds to the institution at Shelton, which, with the one at Meriden, is particularly convenient for New Haven. There is also available the Gaylord Farm Sanatorium at Wallingford, which has 100 beds for incipient cases. This institution is maintained by the New Haven County Anti-Tuberculosis Association; and the group of public-spirited citizens who have financed and managed this institution deserves the gratitude of the community for an undertaking which is looked to as a model the country over.

The facilities for the care of the tuberculous have not been quantitatively adequate to meet the need in recent years. Ten or more cases in urgent need of sanatorium treatment are frequently on the waiting list of the dispensary at a given time; and the Poor Farm at Springside is frequently forced to receive tuberculous patients who should be under sanatorium care. The new hundred-bed hospital now under construction by the New Haven Hospital, designed particularly for the treatment of advanced cases, should, however, meet the need for institutional care for the immediate future.

A conscientious tuberculous patient need not be a menace to family and friends, but one of the most serious problems in the prevention of tuberculosis is the control of the willfully careless consumptives. There are individuals in New Haven who have been turned out of sanatoria be-

cause of willful disobedience to rules, intemperance and the like, and who go back and forth from the tenements to the dispensary and the poor-house without adequate control, and a constant menace to their fellows. In New York State such individuals are committed through summary legal process and are kept under institutional supervision and forced to obey the necessary rules by the authority of the law. The ordinance recently adopted for the control of communicable disease provides that "it shall be the duty of said Department of Health, through its accredited agents, to maintain such adequate quarantine or isolation of those sick of, and those proven carriers of, notifiable diseases as shall be sufficient for the protection of the public health." Tuberculosis is one of the notifiable diseases and we see no reason why the recalcitrant tuberculous patient should not be treated under this rule precisely as a case of small-pox would be. We therefore urge as

Recommendation XXXIX. That the Department of Health adopt vigorous measures for the control of the willfully careless consumptive, by forcible control when necessary, along the lines adopted in dealing with other forms of communicable disease.

The continuance and expansion of the work of the Day Camp and the extension of instructive public health nursing service seem to us the other pressing needs of the situation; and it is clear, in view of the splendid work done by private agencies, that the city should do its share in those directions where help is needed. In his letter to us of April 18, 1916, Dr. Wright listed among the special subjects for our consideration, "the establishment of an institution for the care of the tuberculous cases of this city with nurses to investigate and care for domiciliary cases," and "the establishment of a municipal dispensary." We do not feel that further institutional or dispensary facilities are indicated at present; but the development of public health nursing and the continuance and extension of the work of the Day Camp seem to us essential. As in the case of infant welfare work, these activities should eventually be undertaken by the city, but until the health officer is provided with a proper corps of trained lieutenants, we feel that it would be better to leave the tuberculosis work under its present efficient management. For the present the largest returns can be secured from the city's funds by expending them through well-organized existing agencies.

Recommendation XL. That the city appropriate \$3000 a year for extending the work of the Visiting Nurse Association in the care and prevention of tuberculosis and \$2000 a year for the maintenance of the Day Camp; and that pending such an arrangement every effort be made to maintain the Day Camp through the generosity of private individuals.

In addition to these immediate needs we are of the opinion that the

Department of Health should be in direct contact with the whole anti-tuberculosis campaign and should exert a coördinating and directive influence over all its phases. In a matter of so much moment there should be some one person whose business it is to know all that is going on in dispensary work, visiting nursing, and sanatorium care, to see that all agencies are effectively working together, and to plan for constructive development in the future. We therefore urge as

Recommendation XLI. That there be added to the staff of the Department of Health a competent physician trained in anti-tuberculosis work (at a salary of \$2500) to supervise and coördinate and develop the campaign against this disease along the most effective lines.

A discussion of this general subject would be incomplete without reference to the excellent work of the Employees Tuberculosis Relief Association, which was founded through the initiative of the Chamber of Commerce in 1912 and which has set the standard for many similar organizations elsewhere. The Association is supported by purely voluntary contributions from employers and employees, and after a firm is once accepted, all its employees receive the benefits of the Association whether they have personally contributed or not. According to the Journal of the Association for August 5, 1916, "the employees of forty-six mercantile and commercial concerns and twenty theaters and moving picture houses are counted in its membership to a total of over forty thousand." During 1915 the Association received \$11,385.32, of which \$9763.32 came from contributions of the affiliated firms and employees. It spent \$9597.78, of which \$8719.65 went for sanatorium treatment. The Association had a balance of \$6795.71 on hand December 31, 1915, and is at present in a strong position financially. We cannot, however, avoid pointing out the serious effect which severe industrial depression might have upon an organization which has assumed a certain moral responsibility to provide sickness benefits but is dependent on absolutely voluntary contributions which might cease at any time. It is greatly to be hoped that some way may be found of placing this most valuable enterprise on a firmer financial basis.

Problems of Venereal Disease

The restriction of communicable diseases of a venereal nature involves far-reaching problems, social and educational, as well as medical. It is with the latter that we are concerned in the present discussion.

The first step in the control of venereal disease is the introduction of an effective system of notification. The law of the State of Connecticut calls for the reporting of such diseases without the name of the patient; but even this very moderate requirement is a dead letter in New Haven.

During the last six months of 1916 there were reported in the state 276 cases of venereal disease, of which 142 were reported from Hartford, 73 from Bridgeport, and not one from New Haven.

In a report to the Hartford Board of Health some years ago Dr. Paul Waterman outlined the value of notification of venereal disease as follows:

"The advantages of this procedure are that it would probably be the most direct method of indicating to and of impressing upon the public mind the serious economic relations of venereal diseases, that it would establish a growing mass of statistics concerning venereal disease, from which indications for new or modified methods of their municipal control might be obtained, and that the board might place in the hands of each patient, acting through the physician or institution, a schedule of instructions concerning the limitation of the spread of such diseases. The two chief benefits to be derived from registration are advantage to the individual through gratuitous or improved treatment, and to the community by limitation of the spread of the disease by means of relative or absolute quarantine."

Provision for laboratory diagnosis is essential to success in such a campaign and the State Board of Health laboratory at Middletown now offers facilities for such diagnosis to the physicians of the state who, it is gratifying to note, are making rapidly increasing use of this opportunity. During the six months, July to December, 1916, with only 276 cases of venereal disease of any kind reported, the state laboratory made 1996 Wassermann tests for syphilis, of which 435 were positive.

We believe that the Board of Health should take definite steps to undertake the education of the local medical profession in regard to the importance of reporting cases of venereal disease, and securing prompt laboratory diagnosis. We also feel that it would be most desirable for the board to prepare for distribution to patients, by physicians and in other ways, an educational circular such as is in use in Hartford, giving information which will inform those affected with these diseases as to the possibilities of cure and the precautions which should be taken to safeguard others from infection.

Recommendation XLII. That the Board of Health undertake an organized educational campaign among physicians in regard to the prompt diagnosis and notification of venereal diseases, and prepare a circular in regard to the prevention and cure of these diseases for distribution to those whom it might benefit.

From a medical standpoint the greatest need in combating venereal disease is to provide adequate clinical facilities for treatment and to secure the attendance of those in need of such medical care. The New



FIG. XIX

THE NEW HAVEN DISPENSARY—AN IMPORTANT CENTER OF PREVENTIVE WORK

Haven Dispensary operates a venereal day clinic, which is entirely adequate from a medical standpoint, but which is not provided with the social service staff necessary to follow up cases into the home. Such follow-up work is often of inestimable value in securing the treatment of innocent victims of these diseases. Furthermore, serious difficulties are experienced in securing the salvarsan required for the treatment of the cases which do come to the dispensary; and finally the establishment of an evening clinic is urgently needed to provide for persons who cannot attend in the daytime.

It is the belief of the executive board of the Connecticut Society for Social Hygiene that the best step that could be taken for the betterment of conditions in this regard would be the organization of a special committee of the Civic Federation for the study of the general problem of social hygiene. Such a committee would in the future be the local center for the valuable educational work of the state society, and it could at once take steps to secure funds for the extension of clinical facilities, so much needed at the present moment.

Recommendation XLIII. That the Civic Federation organize a committee on Social Hygiene to study the general problems of venereal disease in New Haven, to raise funds for the provision of salvarsan treatment and for the extension of clinical facilities, particularly on the social service side, and to take part in the state-wide educational movement now in progress in regard to the broader problems of social hygiene.

Mental Hygiene

A survey of the general health situation would not be complete without at least brief reference to the problems of mental disease.

New Haven is fortunate in this respect in being the headquarters of the Connecticut Society for Mental Hygiene, the pioneer organization of its type in the United States and still one of the strongest and most efficient. The society carries on a broadly planned educational campaign in regard to the prevention and treatment of mental disease and maintains in New Haven a weekly clinic at the New Haven Dispensary. The medical work of this clinic is done by physicians who come in alternate weeks from the Middletown State Hospital and the Hartford Retreat, respectively. The general educational and follow-up work of the clinic is carried on by the secretary of the society. During the year ending October 31, 1916, 94 new cases were treated at the clinic and 52 old cases were kept under supervision. The secretary interviewed 162 patients and 214 friends of patients at her office and made 389 home visits to patients or visits on their behalf.

The great need at present in the field of mental hygiene is for a psy-

chopathic ward connected with the New Haven Hospital. Formal commitment through the Probate Court is now the only means of placing a patient under restraint, and on account of the expense of this procedure and for other obvious reasons the family is often reluctant to take such a step. The result is delay which in many cases greatly lessens the chance of recovery and in other cases may make the patient a grave danger to himself and others. It is very properly "one of the constant efforts of this (the Mental Hygiene) Society to assure patients and their friends that mental disorders are like any other physical illness and as susceptible of treatment." It is extremely difficult, however, to establish this point of view in the community if mental disease is officially treated as in the first instance a legal problem, which must be the case so long as no hospital facilities are available for the immediate reception and supervision of suspicious cases. It is greatly to be hoped that funds may soon be forthcoming for the extension of the work of the New Haven Hospital along this important line.

Public Health Education

The work of the modern health department is becoming year by year increasingly an educational one; for the larger objectives in view cannot be attained unless the active coöperation and intelligent interest of the individual citizen are secured.

The instructive work of the public health nurse is perhaps the most direct and most fruitful form of health education, but it should be supplemented by a broadly organized campaign of which printed matter, lectures and exhibits form essential parts.

The monthly bulletin of the Department of Health has a circulation of 1600 copies. It contains clear and effective editorials by Dr. Wright, admirable health cartoons, and the results of the scores of food stores, restaurants and the like. Exception may be taken to the controversial treatment of certain moot questions in regard to the communicable diseases; but in general the bulletin is a highly creditable and a useful production.

In the line of special literature relating to particular topics the department has good circulars in regard to typhoid fever, tuberculosis and other diseases, as well as the leaflets on Advice to Housekeepers, Care of Milk in the Home and Infant Feeding, the latter in Italian as well as in English.

Little use has been made of the newspapers as a vehicle for publicity and this seems to us unfortunate. The maintenance by many of the leading newspapers of the country of health columns edited by highly paid experts shows that health matter has a distinct news value, and we believe that by some effort the coöperation of the New Haven papers

could be secured for a campaign along these lines which would yield fruitful results.

A health exhibit organized by the department was held at the Public Library in the fall of 1914,—as we understand with marked success. A course of lectures to parents was arranged to be given in the school buildings in 1915; and in the fall of 1915 the department offered to provide lectures on health topics to clubs and organizations desiring to avail themselves of the privilege.

A good beginning has therefore been made along various lines of public health education, but we believe that more vigorous efforts should be made in the future. Particularly in regard to the constitutional diseases of adult life, which show a high incidence in New Haven and which can only be controlled by education in the principles of personal hygiene, there is an immense opportunity for profitable work.

It cannot be expected that educational work of this kind will be vigorously developed so long as the health officer is compelled to devote his personal attention to the supervision of every detail of office work as at present.

Recommendation XLIV. That the public health education work of the Department of Health be extended and amplified, especially with reference to the control of the constitutional diseases of adult life, and particularly by the fullest possible use of the resources of the daily press.

The Health Department Budget

The budget of the New Haven Health Department (excluding the sum paid for garbage collection) was \$32,738.75 in 1915; it was \$36,711.64 in 1916; and \$40,205 has been appropriated for the present year. These appropriations amount (using the census estimates of population) to 22, 25 and 26 cents per capita, respectively.

Financial Statistics of Cities for 1915 (United States Census Bureau) includes in its estimates certain minor items not directly chargeable to the health budget and figures New Haven's health expenditure at 30 cents per capita. The distribution of expenditures for all the 43 cities in the population group, 100,000 to 300,000, is as follows:

HEALTH EXPENDITURE IN CITIES HAVING POPULATIONS BETWEEN 100,000 AND 300,000, UNITED STATES CENSUS DATA, 1915

Cents per capita	Under 20	20-30	30-40	40-50	50-60	60-70
Number cities in each class..	13	10	7	5	3	5

New Haven stands near the middle of the list. About half the cities do even less than New Haven; while on the other hand Grand Rapids, Mich., Memphis, Tenn., Richmond, Va., Syracuse, N. Y., and Worces-

not comparable

In addition to these salary increases, an allowance of perhaps \$3000 should be made for medical supplies, stationery and sundries which would be needed for the new appointees proposed. The new appropriation called for by our plan would not really be \$34,000 but about \$27,000, since the elimination of the office of Registrar of Vital Statistics would save \$6850. Taking the larger sum, however (since vital statistics work should properly be included in the health budget), and adding it to the present appropriation of \$40,205, gives a total health appropriation of \$74,000, which for an estimated 1918 population of 154,865 works out at a little less than 48 cents per capita.

We believe that this appropriation is needed in order to give New Haven an effective health department, and that with this sum a complete and modern system of health protection can be provided. We therefore urge as

Recommendation XLV. That the budget of the New Haven Health Department be increased from \$40,000 to \$74,000, so as to make possible the various extensions of its activities specified in earlier recommendations.

D. THE VITAL STATISTICS OF NEW HAVEN

After considering the general sanitary condition of New Haven and reviewing the machinery available for an organized campaign of life saving, it remains to discuss very briefly the actual state of the city's health as revealed by vital statistics.

The General Death Rate

The crudest and most general measure of the health of a community is its general death rate, or the number of annual deaths per 1000 persons in the total population. On the assumption of a uniform arithmetical increase of population such death rates have been calculated and plotted in Fig. 20 for the past ten years. Corresponding figures for all registration cities are plotted on the same chart as a norm.

The sharp rise in the death rate of New Haven from 15.7 in 1915 to 17.0 in 1916 is probably largely illusory, the apparent increase being in part due to the fact that the abnormal increase in population, which has resulted from recent industrial developments, is not allowed for in our population estimates.

GENERAL DEATH RATE (PER 1000)

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
New Haven	18.8	18.1	16.4	16.9	16.5	16.7	16.5	15.9	16.1	15.7	17.0
All registration cities	16.9	17.1	15.7	15.4	16.1	15.3	15.0	15.2	14.8	—	—

On the other hand the data for the years 1908 to 1914 make it clear that the death rate of New Haven has been consistently high, about one point per thousand above the average for all registration cities. The factors which contribute to this excess will later be discussed in some detail.

The principal causes which contribute to the death roll in New Haven are shown for the last five years (1910-14), for which census figures are available, in the table below and in Fig. 21.

PRINCIPAL CAUSES OF DEATH IN NEW HAVEN, 1910-14

Disease	Percentage of deaths from all causes	Disease	Percentage of deaths from all causes
Pneumonia	12.6	Violence	5.4
Organic heart disease	10.2	Diarrhea (under two years)	4.4
Nephritis	8.1	Bronchitis and other respiratory diseases	2.8
Tuberculosis of the lungs	7.3	Acute communicable diseases (D, SF, WC, M)	2.6
Cancer	6.1	Typhoid fever	1.2
Cerebral hemorrhage	5.8		
Congenital debility	5.7		

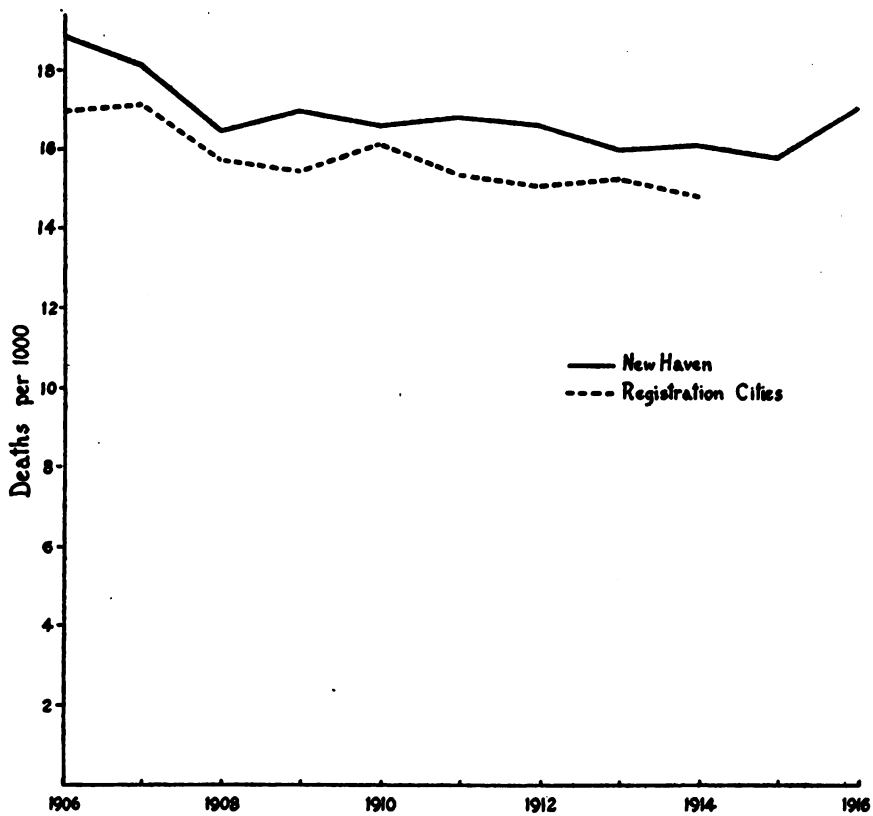


FIG. XX

The General Death Rate of New Haven compared with the average for all Registration Cities

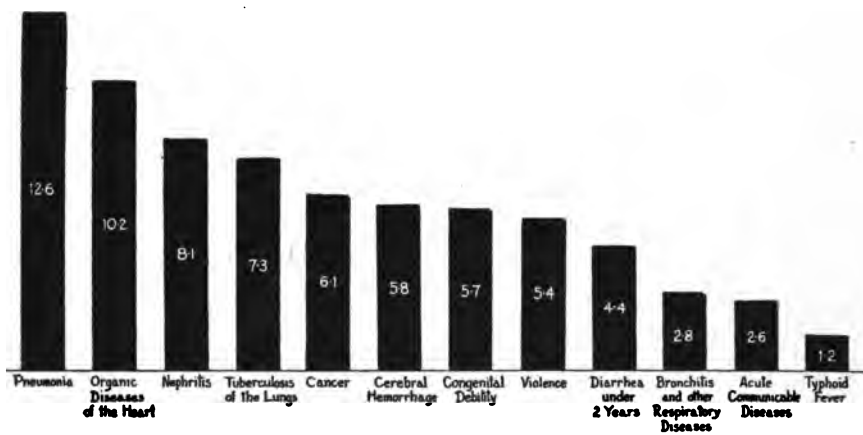


FIG. XXI

Principal Causes of Death in New Haven (1910-1914)
 Figures indicate percentage of deaths from all causes

Infant Mortality

A much more significant index of the sanitary status of a community is its infant mortality rate,—the ratio of deaths under one year to one thousand births. This rate is very clearly and directly affected by an aggressive public health campaign. Data for the group of registration cities not being available we have in this case compared the New Haven figures with those for New York City, where the campaign against infant mortality has been conducted with signal success.

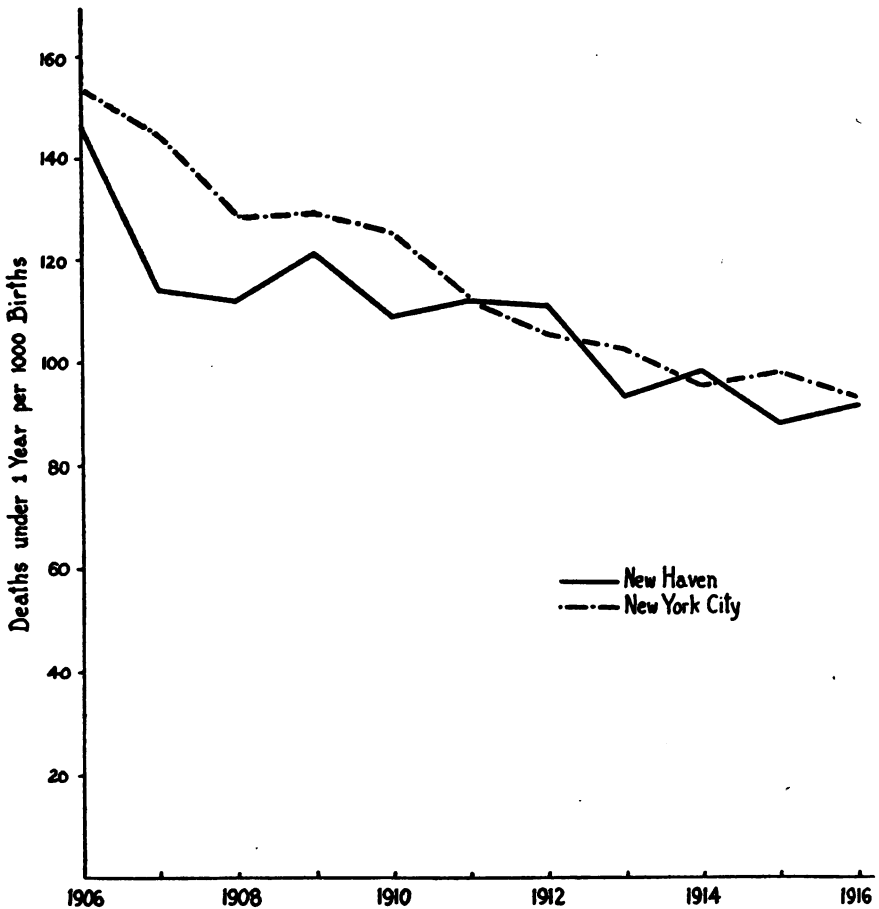


FIG. XXII

Infant Mortality Rate in New Haven compared with New York City

INFANT MORTALITY (DEATHS UNDER ONE PER THOUSAND BIRTHS)

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
New Haven	146	114	112	121	109	112	111	93	98	88	91
New York	154	144	128	130	126	112	105	102	94	98	93

It will be noted that there was a very sharp drop in the infant mortality rate of New Haven in 1907 coincident with the beginning of the health department campaign for the improvement of the milk supply by farm inspection. (The 1906 figure was not abnormally high for those days. The rate for 1905 had been 135.) Then the figure remained at 109 to 121 for six years and dropped nearly twenty points in 1913 when the work of the infant welfare stations began to be effective. The rate of approximately 90 maintained for the past two years is highly creditable and offers gratifying evidence of the good results so far achieved.

Acute Communicable Diseases of Childhood

For the purposes of such a comparison as this the three common communicable diseases of childhood may conveniently be considered together.

The tables and charts indicate that scarlet fever has been consistently low and whooping cough consistently high (though decreasing from year to year) in New Haven, as compared with the average of all registration cities, while measles has fluctuated widely due to annual variations common to this disease when a comparatively small population is considered.

SCARLET FEVER DEATH RATE PER 100,000

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
New Haven	0.8	2	2.6	16	8	10	6	9	5	3	3
All registration cities..	9	13	15	14	14	11	8	11	8	—	—

MEASLES DEATH RATE PER 100,000

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
New Haven	28	5	6	24	5	2	19	1	22	8	4
All registration cities	14	11	11	11	13	10	9	13	7	—	—

WHOOPING COUGH DEATH RATE PER 100,000

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
New Haven	28	9	11	20	10	13	13	8	5	7	10
All registration cities	15	11	10	9	11	11	8	9	9	—	—

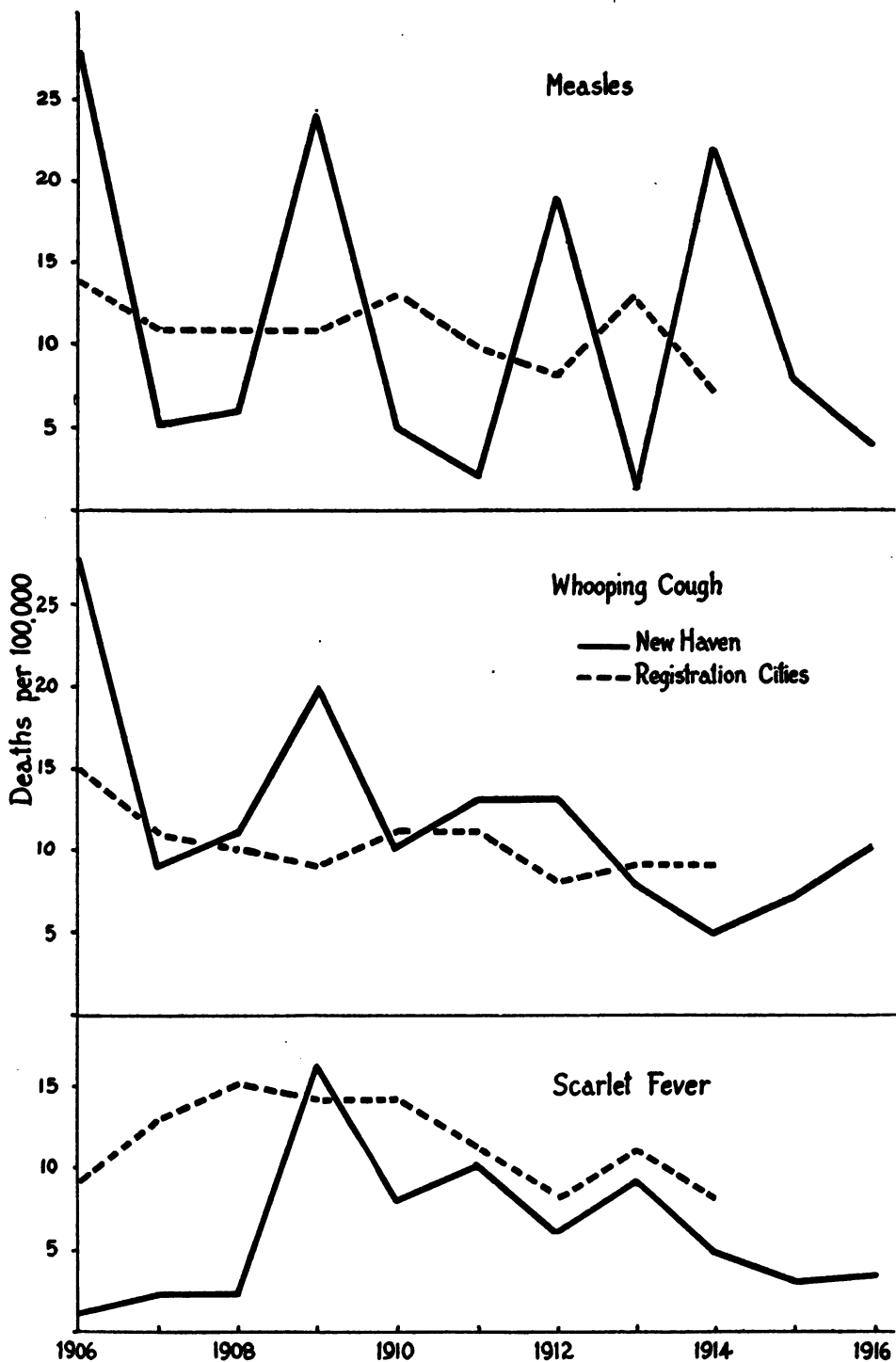


FIG. XXIII

Death Rate from Three Acute Communicable Diseases in New Haven compared with the average for all Registration Cities

Diphtheria

Diphtheria is one of the definitely preventable diseases and here too the showing made by New Haven is a creditable one. The rate as indicated in the table and diagram dropped below the average for the registration cities in 1909 and has remained there ever since.

DIPHTHERIA DEATH RATE PER 100,000

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
New Haven	37	28	26	13	13	19	12	16	19	24	15
All registration cities	29	27	25	24	25	22	20	22	21	—	—

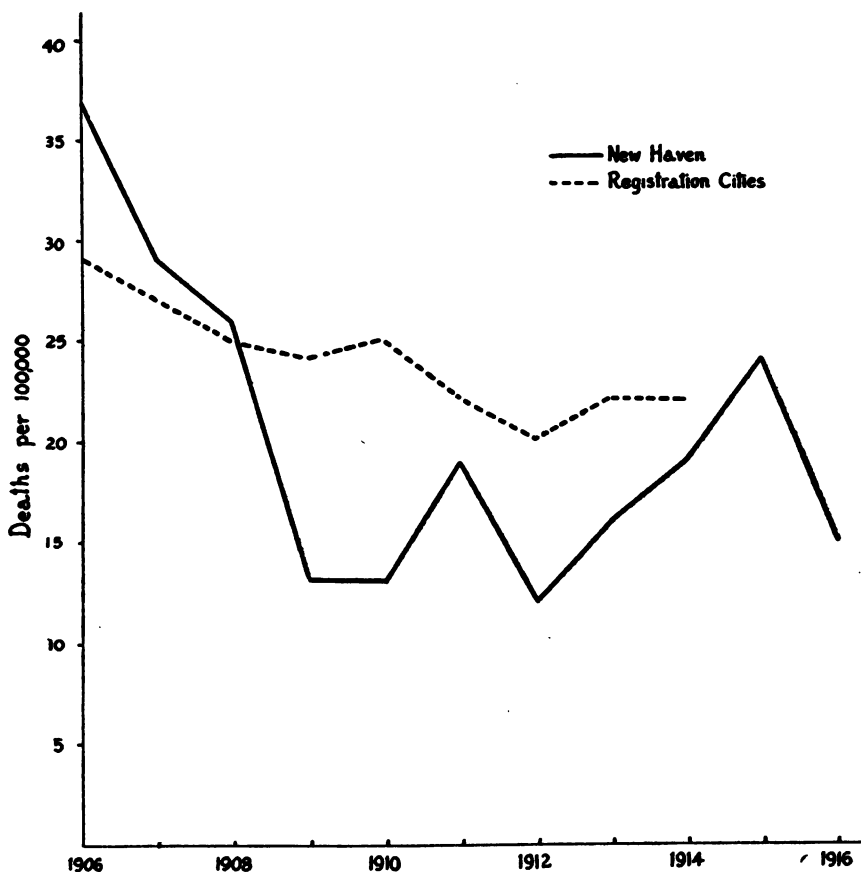


FIG. XXIV

Death Rate from Diphtheria in New Haven compared with the average for all Registration Cities

Typhoid Fever

The typhoid fever rate of New Haven has been less satisfactory than that for any other of the communicable diseases. Even here, however, the diagram indicates that New Haven has been just about an average American city. The curve shows normal chance fluctuations but its average height and general trend are almost identical with that plotted for the group of registration cities as a whole.

TYPHOID FEVER DEATH RATE PER 100,000

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
New Haven	53	29	33	21	18	25	24	13	15	18	8
All registration cities	34	32	25	21	24	20	16	16	14	—	—

By comparison, however, with the large number of cities (such as Boston, Bridgeport, Cambridge, Cincinnati, Jersey City, Lowell, Newark, New York, Paterson, Pittsburgh, St. Paul, Scranton, Seattle, Somerville, Spokane, Worcester) which now show typhoid death rates below 10 per 100,000, the New Haven death rates prior to 1916 suggest that an improvement is urgently needed. We have made a somewhat extensive study of the statistics of this disease for the period 1911-15 in the hope of throwing light upon its causation. No connection could be demonstrated with any of the five water supplies of the city, and the seasonal prevalence is such as to negative a water-borne origin. The disease shows a regular and sharply marked summer increase, with monthly averages of ten cases or less per month from December to June, rising to 21 for July, 40 for August, 30 for September, 19 for October, and 14 for November. Water-borne typhoid occurs in winter and spring. A careful study of records for these five years shows no evidence of epidemics associated with particular milk routes.

The high typhoid rates have more or less consistently manifested themselves in Wards 5, 11, 6, 7, 3, 9 and 4. With the exception of Ward 11 these are all wards inhabited by a relatively poor population and, as will be shown later, the incidence of this disease corresponds roughly with the incidence of tuberculosis and infant diarrhea. It would seem from all these facts that the excess of typhoid fever has been due chiefly to general insanitary conditions of living, and in particular, probably, to privies and carelessly kept semi-public toilets, from which infection may so easily be spread by flies. Dr. Lewis actually identified one such privy and one such toilet, each used by a typhoid carrier, as centers of neighborhood outbreaks of typhoid in 1915, and the elimination of these two foci is believed by him to be largely responsible for the drop in the death rate to the low figure of 8 per 100,000 in 1916.

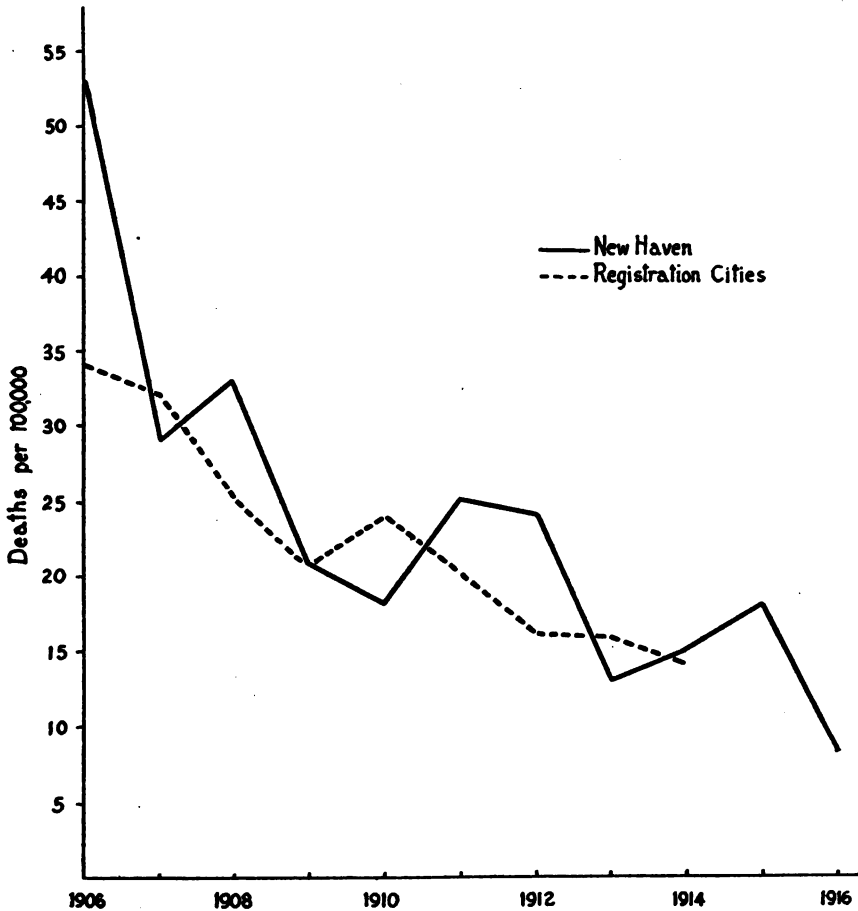


FIG. XXV

Death Rate from Typhoid in New Haven compared with the average for all Registration Cities

We have ourselves been impressed with one other possible factor, the proximity of the highly polluted harbor waters. The four wards showing the highest typhoid death rates, Wards 5, 11, 6 and 7, are all in the immediate vicinity of the Quinnipiac River and one of them (Ward 11) has a much higher rate than would be expected from its general social status (see Fig. 30). We are inclined to believe that bathing in the polluted harbor waters may be an appreciable factor in New Haven typhoid.

Tuberculosis

The statistics for tuberculosis are on their face among the most gratifying of all the data analyzed in connection with this study.

TUBERCULOSIS (LUNGS) DEATH RATE PER 100,000

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
New Haven	160	186	145	176	147	124	102	113	111	82	85
All registration cities.....	178	175	165	158	161	154	146	142	143	—	—

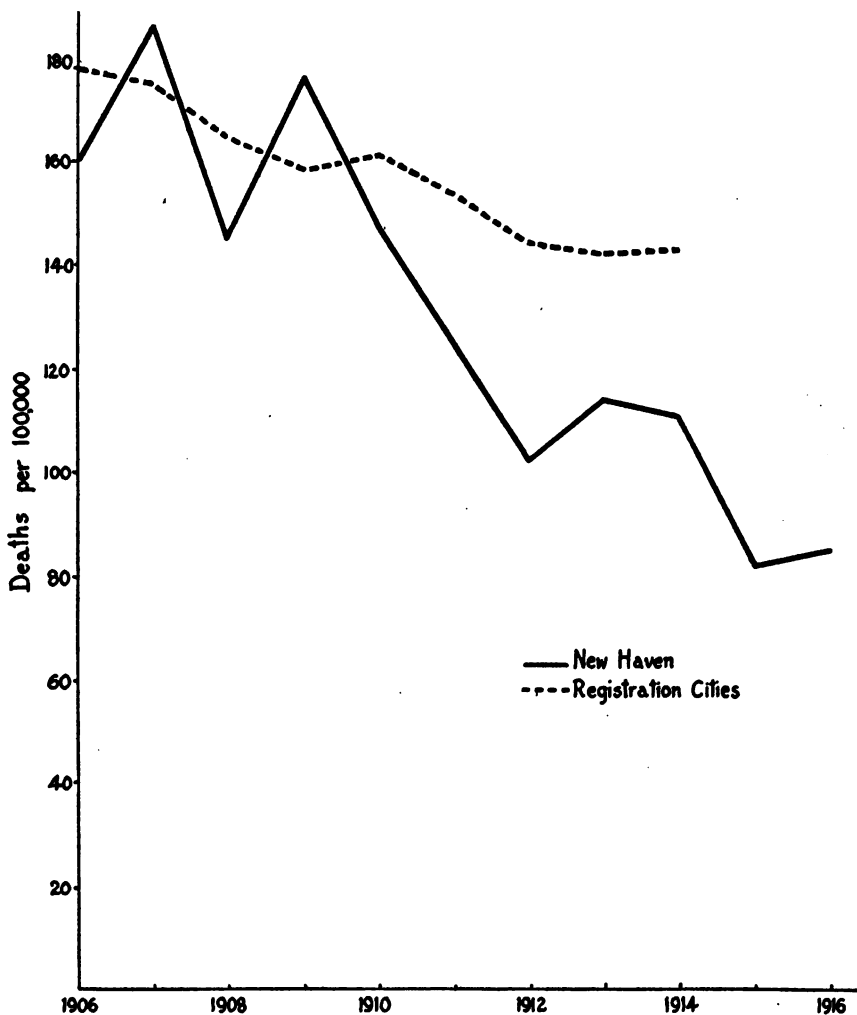


FIG. XXVI

Death Rate from Tuberculosis in New Haven compared with the average for all Registration Cities

Since 1909 the death rate from tuberculosis of the lungs has dropped almost steadily from year to year and has recently been 30 points below the average value for the group of registration cities. In view of the fact that the death rate from pneumonia is as much above, as that from tuberculosis is below, the normal we have considered the possibility of fallacies due to erroneous diagnosis. A study of the age distribution of pneumonia, which will be reviewed later on in this report, makes it fairly clear, however, that no considerable transfer has taken place from tuberculosis to pneumonia. The latter disease reaches a maximum in infancy and old age, while tuberculosis deaths occur in middle life, and if there were any serious error of this kind the New Haven pneumonia rate would be unduly swollen between the ages of 5 and 39. Such, however, is not the case.

Another and more convincing explanation of the surprisingly low tuberculosis rate recorded for New Haven is to be found in the fact that deaths from tuberculosis in state institutions are charged to the towns in which the institutions are located rather than to those from which the patient came. Dr. J. T. Black, secretary of the State Board of Health, informs us that 53 deaths of New Haven residents occurred in the four state hospitals in 1915 and 43 in 1916. If these were added to the tuberculosis deaths recorded in New Haven they would increase the rate for this disease about 30 points and make it identical with the general average for the registration cities. Since the state hospitals were opened in 1907-09 the cause of the apparent drop in death rate in 1910-11 is obvious.

The Cause of the Excessive Death Rate of New Haven

We have seen that the crude general death rate of New Haven is high; and we have now reviewed the principal communicable and obviously controllable causes of death and found them to be low. To what causes then is the high general death rate due?

This question is answered by Fig. 27 in which we have plotted the *differences* between the New Haven death rates for certain individual diseases and the average rates for the group of registration cities (1910-14). It will be noted that the acute communicable diseases and tuberculosis, with infant diarrhea (the chief single factor in infant mortality) and violence, are all below the line, that is, they show a lower death rate for New Haven than for the group of registration cities. On the other hand the diseases which show a marked excess in New Haven are pneumonia, cancer and the constitutional disorders of later life, organic diseases of the heart, cerebral hemorrhage and nephritis. Typhoid fever has been slightly in excess in New Haven, and the excess of tubercular

diseases other than lung tuberculosis (which are frequently due to milk infection from tuberculous cows) seems to us highly significant in view of the fact that so large a proportion of the New Haven milk supply is unpasteurized. The high rate for congenital debility emphasizes the need for prenatal care, which we have pointed out in an earlier section.

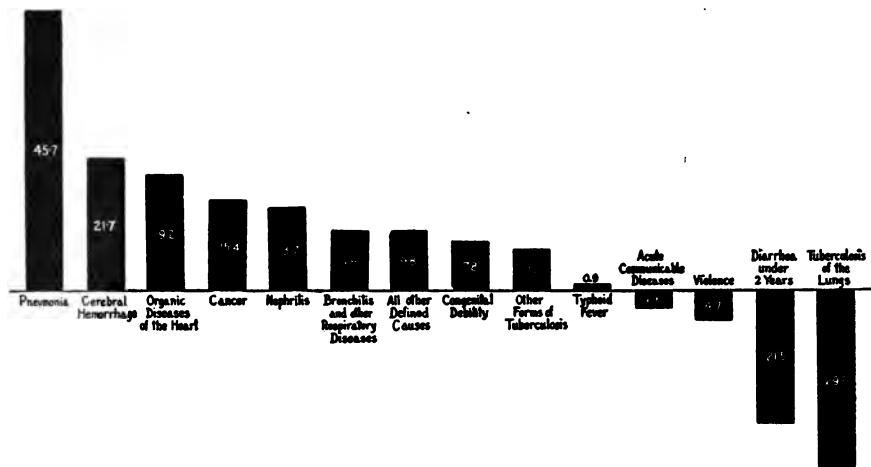


FIG. XXVII

Excess or Deficiency in the Death Rate from Individual Causes in New Haven as compared with the average rate for the group of Registration Cities (1910-1914)

Figures indicate differences in rates per 100,000 population between New Haven and the registration cities. Diseases in which the New Haven rate exceeds the registration group average are plotted above the line, and those in which the New Haven rate is less than the average registration cities below the line.

The Problem of Pneumonia

Pneumonia is the most deadly of all diseases in New Haven, causing 12.6 per cent of the deaths from all causes. Furthermore, as shown by Fig. 28, its incidence here is markedly excessive as compared with the general average for all registration cities. The New Haven rate for the period 1906-14 was 181 per 100,000 as against 140 for the group of registration cities.

PNEUMONIA DEATH RATE PER 100,000

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
New Haven	177	177	115	134	208	212	225	188	193	222	250
All registration cities.....	121	131	105	108	175	157	156	158	151	—	—

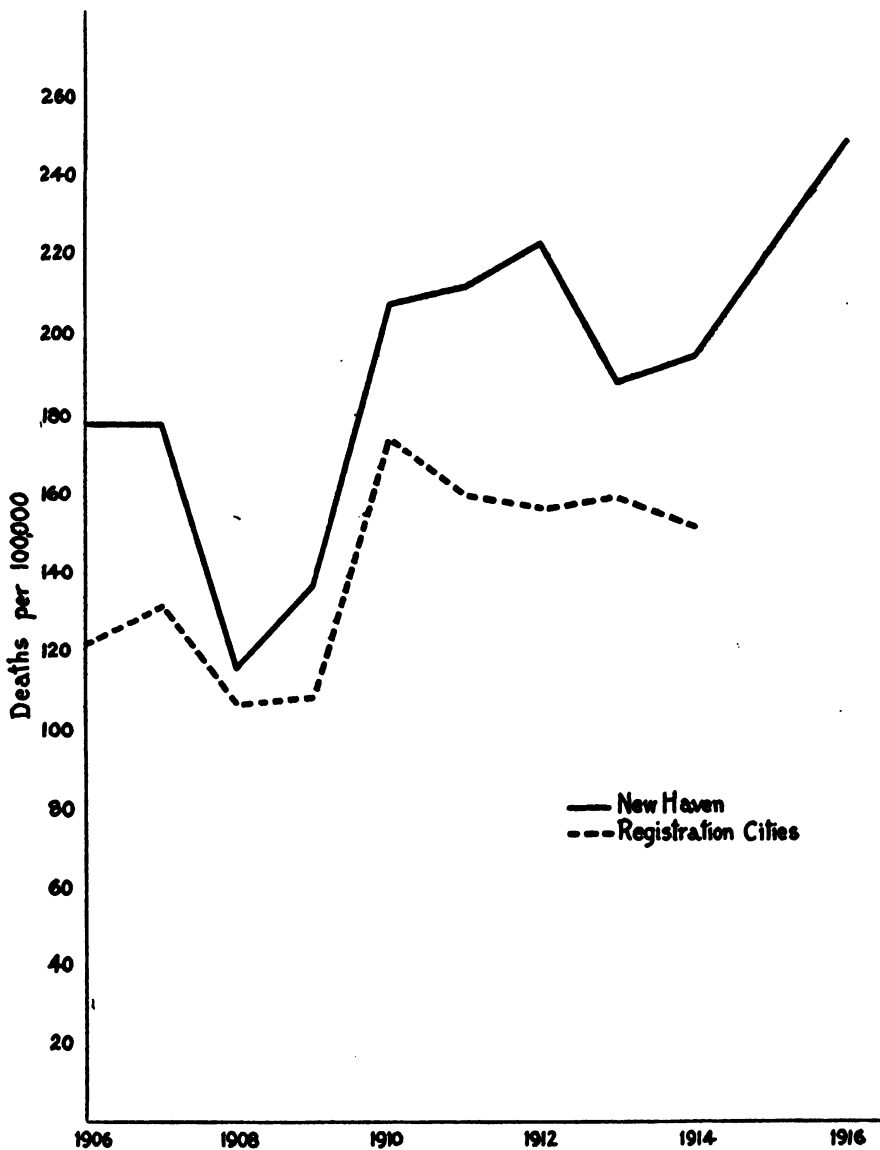


FIG. XXVIII

Death Rate from Pneumonia in New Haven compared with the average for all Registration Cities

It might at first be thought that this high incidence of pneumonia was due to an abnormal age distribution of the population, since pneumonia is preëminently a disease of infancy and old age. Our analysis of the age distribution of the population of New Haven (see page 17), however, scarcely indicates an excess of infants and old people sufficient to account for the difference in death rates. Furthermore the table below shows that the New Haven pneumonia death rate is equally excessive at all age periods.

A statistical study which is now being conducted by Mr. David Greenberg and Mr. C. C. Chen in this laboratory suggests that the problem is primarily one of geography rather than of population. The tables below prepared by them in the course of their study show the pneumonia death rate at different age periods for certain groups of cities. It will be noted that the high pneumonia rate of New Haven is simply typical of a condition which prevails throughout all the New England cities. Aside from the very high rate for pneumonia among infants in Fall River (due chiefly to interference with maternal care due to women's labor), Boston, Fall River, New Haven and Providence show almost identical conditions, conditions which are sharply contrasted with those which obtain in the group of inland cities tabulated for comparison.

The high pneumonia rate in New Haven may therefore be considered as primarily of geographical and presumably of climatic origin. The fact that Mr. Greenberg and Mr. Chen find the rate goes up again in Chicago and other lake cities suggests that either the moisture, or the sudden changes in temperature, associated with the proximity of large bodies of water, may play a part in this phenomenon.

PNEUMONIA DEATH RATES AT DIFFERENT AGE PERIODS (1908-12)

	DEATHS PER 100,000				
	Under 5 years	5-39 years	40-49 years	50-59 years	Over 60 years
Boston	405	49	146	227	507
Fall River	706	34	62	155	458
New Haven	377	47	137	239	590
Providence	371	36	98	202	538
Cleveland	130	20	82	145	358
Cincinnati	107	33	92	123	402
Columbus	197	27	50	93	387
Indianapolis	113	23	58	99	274
Rochester	122	26	80	106	378

Whatever the factors involved, it is clear that the heavy incidence of pneumonia, all over the country, and particularly along the Atlantic coast, constitutes a health problem of no mean magnitude. Furthermore, as

shown by the figures cited on page 106, the prevalence of this disease is increasing from year to year.

Measures for the control of pneumonia may be instituted along two distinct lines. In the first place, it is reasonably certain that a lowering of vital resistance by indoor life in overheated rooms and with over-heavy clothing, followed by exposure to sudden chill, is an important factor in bringing on attacks of this disease, as is a more general reduction in resistance due to overwork, underfeeding, alcoholism and unhygienic living of any kind. Sound habits of personal hygiene and a rational stimulation of the circulatory machinery of the body by fresh air, proper clothing and bathing are therefore essential in the campaign against pneumonia. Infants may be safeguarded along these lines through the instructive work of the infant welfare stations, and the hygienic education of the general public will help in combating the disease among adults.

The recent advances in bacteriology which have shown that pneumonia may be due to several distinct types of bacteria and have provided us with a serum for the treatment of the disease caused by at least one of the most deadly types have opened the way for control along more direct public health lines. We believe that the time is soon coming when pneumonia should be made a reportable disease and that it is already proper to insist that health departments provide diagnostic facilities for determining which type of pneumococcus is at work in a given case and supply the appropriate sera for treating this disease.

Cancer

The death rate from cancer is higher in New Haven than in the group of registration cities, and it appears to be steadily increasing from year to year. The recent studies of Mr. F. L. Hoffman indicate that this increase is a real and not merely an apparent one.

CANCER DEATH RATE PER 100,000

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916
New Haven	79	86	92	98	95	91	102	96	114	94	110
All registration cities	74	75	76	79	81	81	84	87	88	—	—

Like pneumonia, cancer has in the past figured but slightly in the program of the Health Department. We know little of its cause and we have no medicaments to cure it. On the other hand, the evidence is clear that early recognition and prompt surgical care will, in a considerable proportion of cases, effect a cure. Just as clinics are organized to secure early diagnosis of tuberculosis and patients are brought to them by a

comprehensive system of popular education, so cancer may be fought with similar methods and similar hope of success. The American Society for the Control of Cancer has been organized to promote just such a movement and many state and city boards of health have begun work along the lines it has laid out. The time is not perhaps ripe for urging the initiation of such a movement on the part of the Health Department of New Haven. The menace of cancer, however, constitutes one of our largest health problems, and Connecticut should at least have a branch of the national society to study this question and crystallize sentiment looking toward definite action in the future.

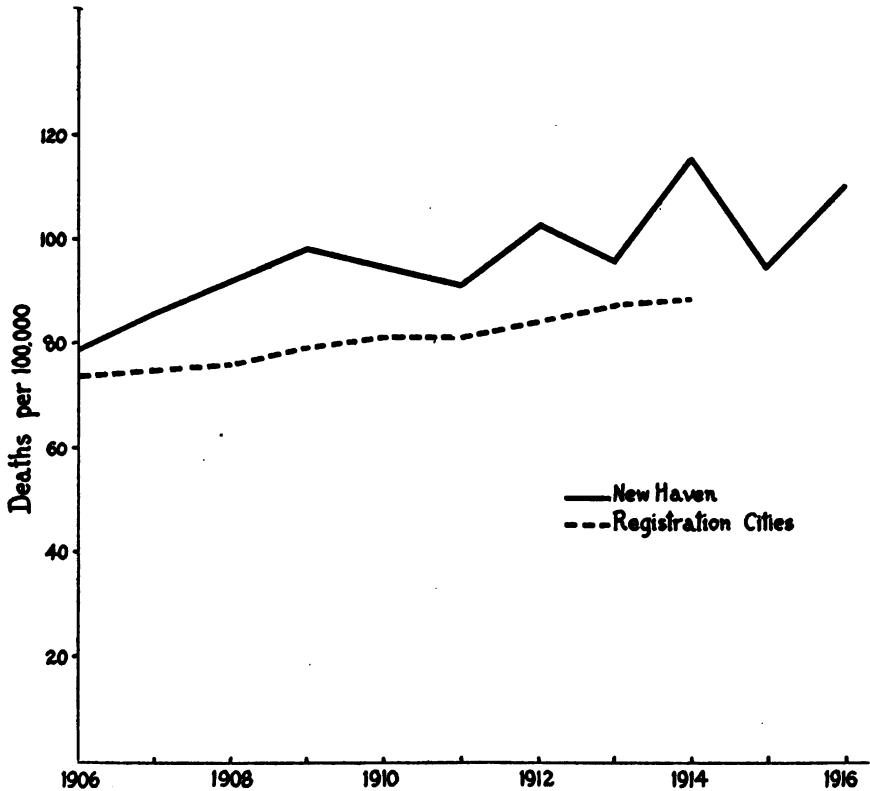


FIG. XXIX

Death Rate from Cancer in New Haven compared with the average for all Registration Cities

Organic Disorders of Adult Life

The three other important causes of death not hitherto discussed are organic heart disease, second in rank and causing 10.2 per cent of all deaths; nephritis, third in rank, causing 8.1 per cent of all deaths; and

cerebral hemorrhage, sixth in rank, causing 5.8 per cent of all deaths. These are all old age diseases due in large measure to normal degenerative changes. Their prevalence in New Haven is partly to be accounted for, as in the case of pneumonia, by the age distribution of the population and perhaps in part by its social make-up.

There is but little that can be done along ordinary public health lines for the restriction of these disorders. A considerable proportion of them are due to obscure bacterial infections and some measure of improvement may be expected from the control of such infections by the supervision of the acute communicable diseases, by the treatment of diseased tonsils and by advances in dental hygiene. General progress in personal hygiene through public health education and the progress of the anti-alcohol campaign will be of material assistance. Our most important weapon against the degenerative diseases will, however, be the growth of systematic medical examination, for the detection and treatment of these disorders in their early stages which is the first essential of a rational and effective control. This, too, is perhaps largely a problem for the future. The movement for health insurance, however, becomes highly significant in this connection.

Is New Haven's Health Task Accomplished?

To summarize our brief survey of the vital statistics of New Haven, it is apparent that while the general death rate of the city is somewhat above the normal, this excess is primarily due to pneumonia, cancer and constitutional disorders of later life which in the past have not commonly fallen within the purview of the Health Department. Infant mortality and the acute contagia, easily controllable diseases, commonly used as indices of the sanitary condition of a community, show gratifyingly low death rates, while tuberculosis and typhoid fever are about normal. It might be concluded from these facts that New Haven may properly rest upon its laurels, pointing with pride to its record for infant mortality and ascribing its pneumonia, cancer and heart disease to causes beyond human control.

We do not believe that such a conclusion will be drawn by the citizens of New Haven. That our record is better than the average registration city in these important respects is encouraging but not satisfying. The increasing death rate from pneumonia, cancer and the degenerative diseases cannot be accepted as an inevitable fact. We have indicated methods by which even these diseases can be attacked with good hope of success. A health department organized along the lines we have laid down with a statistical department, a modern laboratory, a staff of physicians and

nurses, and an organization freeing the Health Officer from administrative detail so that he could work out larger policies would ensure an adequate attack upon these problems in the future.

Even in regard to the classical objectives of the Health Department, much remains to be done. The fact that New Haven has done more than the average city in some respects does not mean that it has done all that it could do or all that the most advanced communities have already done. In the table below we have worked out the death rates from tuberculosis and infant diarrhea and the case rate from typhoid fever for each ward of the city for the years 1911-15. The inequalities manifest indicate how far certain sections of the city are from the health standard of the more fortunate neighborhoods. Wards 3 and 7 have twice as much tuberculosis as Wards 1 and 13. Wards 5 and 7 have three times as much infant diarrhea as Wards 1, 8, 9, 10 or 13. Wards 5 and 11 have twice as much typhoid fever as Wards 1, 8 or 15.

INCIDENCE OF CERTAIN DISEASES BY WARDS

Ward	Deaths per 100,000		Cases per 100,000
	Tuberculosis	Diarrhea under 2	Typhoid Fever
1	40	5	68
2	85	46	98
3	104	71	123
4	73	56	104
5	87	150	348
6	70	82	129
7	148	139	125
8	65	11	51
9	87	32	110
10	57	16	89
11	75	67	150
12	85	58	71
13	52	28	72
14	57	78	71
15	58	42	26

Many factors of course come in to affect such district death rates. For instance, Ward 1 with its large student population is not comparable with any other group. Throughout the city the rate for infant diarrhea will naturally be high in the sections with a high birth rate. Nevertheless, after all allowances are made, the figures do indicate wide and real discrepancies. The one factor which is of supreme importance in relation to these differences is the economic status of the population. Through the courtesy of the Organized Charities, the United Relief Society, the Hebrew Charities Society and the Sisterhood of the Mishkan-Israel Temple, we have obtained statistics of the distribution by wards of the

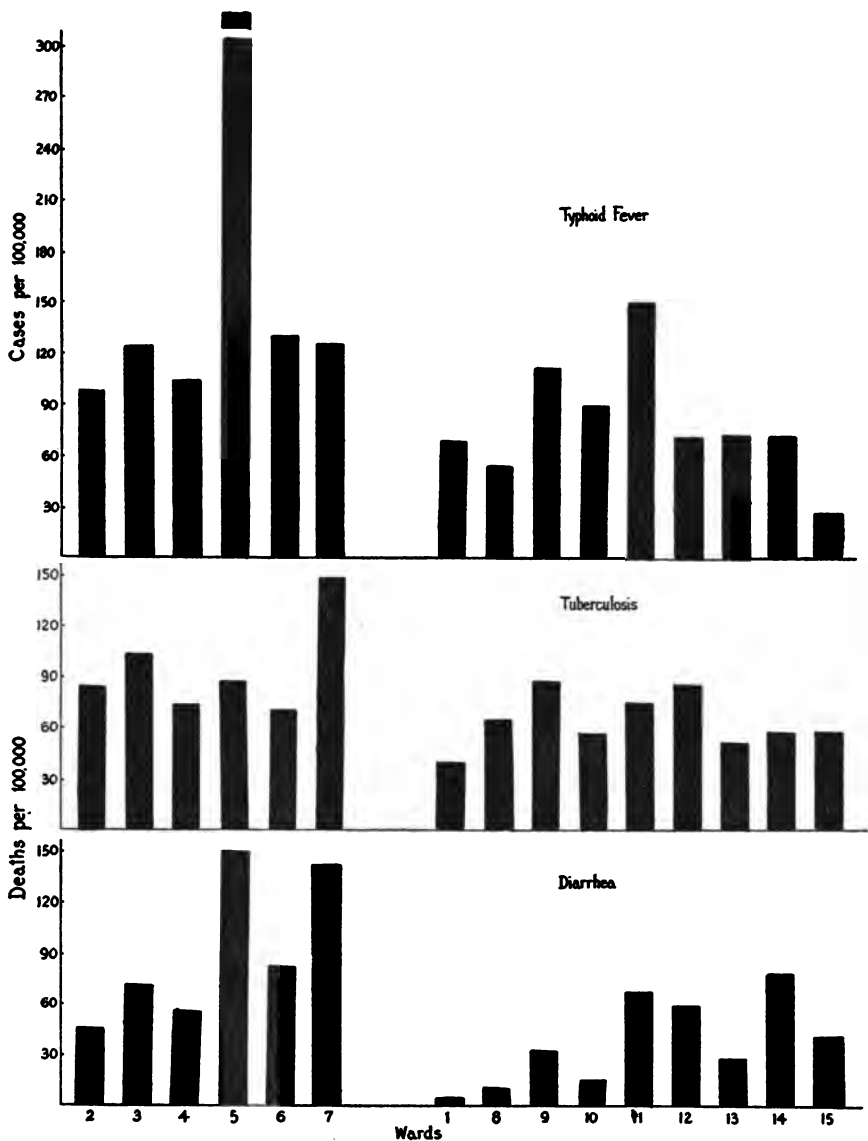


FIG. XXX

Deaths from Typhoid Fever, Tuberculosis and Infant Diarrhea in New Haven by Wards (1911-1915). The poorer wards are grouped together on the left of the diagram, while the more prosperous wards are plotted on the right.

cases which received relief in any form from these organizations during the years 1913-15. The City Department of Charities and Correction was unable to assist us and no attempt has been made to secure data as to relief furnished by churches and other private organizations. The statistics are therefore only of rough approximate significance since they are markedly affected by local inequalities in the distribution of special racial and religious groups. They indicate, however, that the 15 wards of the city may be broadly divided into two groups, Wards 2 to 7 which are inhabited by the poorer population, and Wards 1 and 8 to 15 in which the inhabitants are in general of a more prosperous class. We have plotted in Fig. 30 the tuberculosis and diarrheal death rates and the typhoid case rate for each ward, with the poorer wards on the left and the more prosperous ones on the right. In the table below we have calculated the incidence rates for the two population groups as a whole.

INCIDENCE OF DISEASES IN THE POORER AND IN THE MORE PROSPEROUS SECTIONS OF THE CITY

Wards	Tuberculosis Deaths per 100,000	Diarrhea under 2 Deaths per 100,000	Typhoid Fever Cases per 100,000
2-7	93	68	126
1, 8-15	62	33	73

The inequalities between these figures may perhaps be taken as an indication of certain of the opportunities for public health progress in New Haven. The high death rates in the poorer districts are no doubt in large part due to the direct influence of poverty and ignorance and to the poor protoplasm from which in many cases poverty and ignorance arise. It is precisely these unfortunates who are unable to protect themselves who should be safeguarded by an efficient health department organized for education and for leadership. Sir John Simon, the pioneer English sanitarian, speaking of the closely allied problem of industrial workers, said in one of his reports fifty years ago, "That they have causes of disease indolently left to blight them amid their toil . . . is surely an intolerable wrong; and to be able to redress that wrong is perhaps among the greatest opportunities for good which human institutions can afford."

